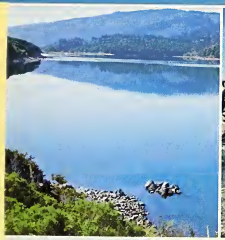
2010 URBAN WATER MANAGEMENT PLAN
FOR THE CITY AND COUNTY OF SAN FRANCISCO

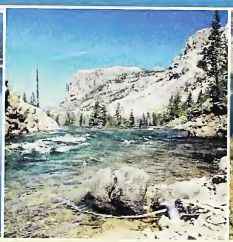
SFPUC
WATER
WASTEWATER
POWER

PUBLIC REVIEW DRAFT

Prepared by: The San Francisco Public Utilities Commission

April 27, 2011





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Contact Sheet

2010 Urban Water Management Plan
City and County of San Francisco

San Francisco Public Utilities Commission (SFPUC)

Date plan submitted to the Department of Water Resources: mm/dd/yyyy

Name of person preparing this plan: Steven R. Ritchie, Assistant General Manager, Water

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The Water supplier is: San Francisco Public Utilities Commission

The Water supplier is a: Wholesale and retail supplier

Utility services provided by the water supplier include:
Surface Water, Groundwater, and Recycled Water

Is This Agency a Bureau of Reclamation Contractor? No

Is This Agency a State Water Project Contractor? No

Abbreviations

AB	Assembly Bill
ABAG	Association of Bay Area Governments
Act	California Urban Water Management Planning Act
ACWD	Alameda County Water District
AMI	Advanced Meter Infrastructure
BACWA	Bay Area Clean Water Agencies
BAWSCA	Bay Area Water Supply and Conservation Agency
BDPL	Bay Division Pipeline
bg	billion gallons
BMP	Best Management Practice
CAP	Community Assistance Program
CCF	hundred cubic feet (volume of water, equivalent to 748 gallons)
CCWD	Contra Costa Water District
CEQA	California Environmental Quality Act
CII	commercial, industrial, and institutional
City	City and County of San Francisco
CUWCC	California Urban Water Conservation Council
DHS	State of California Department of Health Services
DMMs	demand management measures
DSOD	Division of Safety of Dams
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utility District
EIR	Environmental Impact Report
EOP	Emergency Operations Plan
ERRP	Emergency Response and Recovery Plan
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FY	fiscal year
GED	gallons per employee-day
gpcd	gallons per capita per day
gpf	gallons per flush
gpm	gallons per minute
HECW	high-efficiency clothes washing
HET	high-efficiency toilet
HTWTP	Harry Tracy Water Treatment Plant
IRWMP	Bay Area Integrated Regional Water Management Plan

ISA	interim supply allocation
ISG	individual supply guarantee
IWSAP	Interim Water Shortage Allocation Plan
mgd	million gallons per day (flow or usage rate of water)
MID	Modesto Irrigation District
MOU	Memorandum of Understanding
NSMCSD	North San Mateo County Sanitation District
PEIR	Program Environmental Impact Report
PG&E	Pacific Gas and Electric Company
PUMA	Piloting Utility Modeling Applications for Climate Change
RISA	Regional Integrated Sciences and Assessment
RWMP	Recycled Water Master Plan
RWS	Regional Water System
RWSAP	Retail Water Shortage Allocation Plan
SB	Senate Bill
SCS	Sustainable Communities Strategy
SCVWD	Santa Clara Valley Water District
SFPUC	San Francisco Public Utilities Commission
SFUSD	San Francisco Unified School District
SIC	Standard Industrial Classification
SVWTP	Sunol Valley Water Treatment Plant
SWRCB	State Water Resources Control Board
TID	Turlock Irrigation District
ULFT	ultra-low-flush toilet
USEPA	U.S. Environmental Protection Agency
UV	ultraviolet
UWMP	Urban Water Management Plan
WPCP	water pollution control plant
WSA	Water Supply Agreement between SFPUC and its Wholesale Customers
WSAP	Water Shortage Allocation Plan
WSIP	Water System Improvement Program
WSMP	Water Supply Master Plan
Zone 7	Zone 7 Water Agency
°C.	degrees Celsius

Preface

The San Francisco Public Utilities Commission has prepared this 2010 Urban Water Management Plan (UWMP) for the City and County of San Francisco in accordance with the requirements of the 1983 California Urban Water Management Planning Act (Act), California Water Code Division 6, Part 2.6, Sections 10610 through 10656. **Appendix A** contains a copy of the Act, which has undergone several amendments since its adoption. The purpose of the Act is to assure that water suppliers plan for long-term conservation and efficient use of California's water supplies.

The Act requires all urban water suppliers to prepare an UWMP every 5 years. The 2010 UWMPs are due to the California Department of Water Resources by July 1, 2011. As defined by Section 10617, an urban water supplier is a supplier (either publicly or privately owned) that provides water for municipal purposes to more than 3,000 customers (either directly or indirectly) or that supplies more than 3,000 acre-feet of water annually.

Section 1: Plan Preparation

This section summarizes the actions taken by the San Francisco Public Utilities Commission (SFPUC) to assure agency coordination and public participation throughout the development of this 2010 Urban Water Management Plan (UWMP) for the City and County of San Francisco (City).

1.1 Agency Coordination

Coordination with City Agencies: The SFPUC coordinated with City agencies in developing elements of this 2010 UWMP and the documents referenced herein. The SFPUC consulted with the San Francisco Planning Department in developing growth projections. City agencies were notified regarding the SFPUC's intent to review the 2005 UWMP and prepare an updated 2010 UWMP. These City agencies will receive a copy of the draft 2010 UWMP and notification of the date and time of the public hearing, and comments received from the agencies on the proposed 2010 UWMP will be reviewed and addressed, as appropriate. Documentation relating to these efforts and communications will be provided in **Appendix B**.

Regional Interagency Coordination: The SFPUC coordinated with the Bay Area Water Supply and Conservation Agency (BAWSCA) on the development of this 2010 UWMP. BAWSCA is a public agency representing the wholesale agencies served by the SFPUC–i.e., Wholesale Customers of the SFPUC Regional Water System (RWS). Enabled by Assembly Bill (AB) 2058, BAWSCA was established on May 27, 2003 to represent the interests of 24 cities and water districts, as well as 2 private utilities in Alameda, Santa Clara and San Mateo counties that purchase water on a wholesale basis from the RWS.

At BAWSCA's request, the SFPUC provided water supply reliability information for distribution to all BAWSCA members. In addition, the SFPUC provided water supply reliability information directly to Cordilleras Mutual Water Company.

The SFPUC also worked with BAWSCA and the Wholesale Customers to obtain purchase projections through the year 2035. These projections are presented in **Table 16**.

In addition to coordinating with BAWSCA and its member agencies, the SFPUC also communicated with other Bay Area water agencies, including East Bay Municipal Utility District (EBMUD), Santa Clara Valley Water District (SCVWD), Contra Costa Water District (CCWD), and Zone 7 Water Agency (Zone 7).

All Wholesale Customers and other Bay Area water agencies also received mailings regarding the SFPUC's intent to review the 2005 UWMP and prepare a 2010 UWMP. The agencies also received instructions to download the draft 2010 UWMP and notification of the date and time of the public hearing on the draft document. Comments received will be reviewed and addressed, as

appropriate. Documentation of related communications and coordination efforts is on file with the SFPUC.

1.2 Public Participation

The SFPUC has always actively encouraged public participation in its urban water management planning efforts. For the 2010 UWMP update, the following measures will be taken:

- Notification of Intent to update the UWMP was mailed on March 11, 2011 to all cities and counties within which the SFPUC provides water, as well as to other interested parties. A list is provided in **Appendix B**.
- A public hearing will be held on May 24, 2011 during an SFPUC Commission Meeting. A notice of the hearing will be advertised as specified in California Government Code 6066. Additional noticing will be printed in local community papers on May 9, 2011 and May 16, 2011 to reach a more diverse local population. Public comment on the draft 2010 UWMP will be taken at the public hearing, as well as for a period prior to and after the hearing.
- Comments on the draft UWMP will also be taken at the May 16, 2011 meeting of the Citizens Advisory Committee, which was publicly noticed on the SFPUC website.
- The draft 2010 UWMP has been available for review prior to the public hearing at the San Francisco Main Public Library and the main offices of the SFPUC. A copy has also been posted online at **www.sfwater.org.**
- In addition to notification of the general public (i.e., general City Retail and Wholesale Customers), other measures were taken to inform large SFPUC Retail Customers, such as the San Francisco Jail, Lawrence Livermore National Laboratory, Treasure Island, Hunters Point Shipyard, and Groveland Community Services District. These large Retail Customers received mailings regarding the SFPUC's intent to review the 2005 UWMP and prepare an updated 2010 UWMP. They will also receive a copy of the draft 2010 UWMP and notification of the date and time of the public hearing on the draft document.
- An adoption hearing will be held on June 14, 2011 during an SFPUC Commission meeting.

Documentation of the notification and outreach actions identified above will be included in **Appendix B**.

1.3 Plan Adoption, Submittal and Implementation

The SFPUC prepared this 2010 UWMP update and will present it to the SFPUC Commission for adoption on June 14, 2011. Please refer to **Appendix C** for a copy of the SFPUC Resolution adopting this 2010 UWMP update (to be included at a later date).

Within 30 days of SFPUC Commission approval, the adopted 2010 UWMP will be submitted to the California Department of Water Resources (DWR), and a copy will be provided to the

California State Library and to any city or county within which the SFPUC provides water. In addition, throughout this 30-day period, the SFPUC will make this adopted 2010 UWMP available for public review during normal business hours. The SFPUC will implement this adopted 2010 UWMP, in accordance with the California Urban Water Management Planning Act.

Following adoption of the 2005 UWMP, the SFPUC implemented water supply planning programs, such as recycled water and groundwater, identified in the UWMP. These programs were ultimately reflected in the adopted Water System Improvement Program (WSIP), which details project implementation schedules and budgets.

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Section 2: System Description

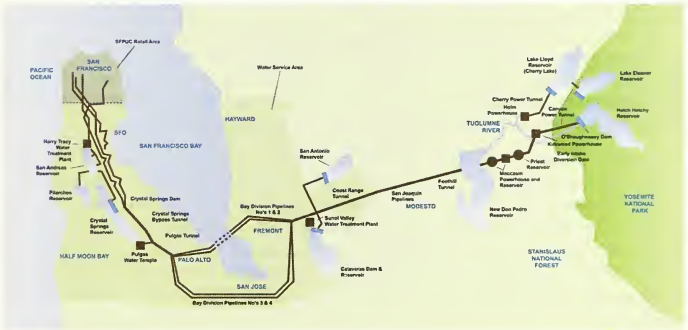
This section describes the SFPUC's water system (including the RWS and in-City distribution system), service area, climate, and demographic features.

2.1 SFPUC Water System Overview

Nearly 2.5 million people rely on water supplied by the SFPUC water system to meet their daily water needs. This water system (**Figure 1**) consists of over 280 miles of pipeline, over 60 miles of tunnels, 11 reservoirs, 5 pump stations, and 2 water treatment plants located outside the City (the RWS) and over 1,250 miles of pipeline, 12 reservoirs, 9 storage tanks, and 17 pump stations[1] located within the city limits (the in-City distribution system).

The RWS draws approximately 85% of its water from the Upper Tuolumne River Watershed, collected in Hetch Hetchy Reservoir in Yosemite National Park, feeding an aqueduct system, delivering water 167miles by gravity to Bay Area reservoirs and customers. The remaining water supply is drawn from local surface waters in the Alameda and Peninsula watersheds.

Figure 1: SFPUC Water System



2.1.1. Historical Development of the RWS

The RWS evolved through the development of two separate water systems: the Spring Valley Water Company and the Hetch Hetchy Project. The Springs Valley Water Company was

[1] Does not include 3 pump stations in Treasure Island.

established in 1858, developing a spring and several creeks into a local water system. It expanded over the years with the construction of Pilarcitos, San Andreas, and Upper and Lower Crystal Springs Dams on the Peninsula, and later with the development of the Pleasanton Well Field, the Sunol Filtration Galleries, and Calaveras Dam in Southern Alameda County.

Very early in San Francisco's development, it was recognized that the local water resources would be inadequate to support a burgeoning metropolis; thus, plans for importing water from the Sierra Nevada were born. In the late 1800s, the City's decision to develop its own water supply system culminated in the planning, financing, and construction of the Hetch Hetchy Project. Because many of the Hetch Hetchy Project facilities were to be located within Yosemite National Park, Congressional approval of the project was required. That approval was granted by the Raker Act of 1913.

The construction of the Hetch Hetchy Project began in earnest in 1914. After almost 20 years of construction (including building of Hetch Hetchy Reservoir and the 1930 acquisition of the Spring Valley Water Company by San Francisco), Tuolumne River water began flowing into the local distribution system. Through the operation of the two systems, the SFPUC has been able to provide the residents of the City and its neighboring communities with a supply of high-quality potable water from protected sources.

Since the 1930s, the major additions to the SFPUC's water system have included the raising of O'Shaughnessy Dam and the development of Lake Lloyd (Cherry Reservoir); the construction of additional pipelines across the San Joaquin Valley; and the local construction of San Antonio Reservoir in Alameda County and the Bay Division Pipelines 2, 3, and 4. Other local projects have included Crystal Springs Pipeline No. 3, Sunol Valley and San Andreas (now Harry Tracy) Filtration Plants, and the Crystal Springs Bypass Tunnel and Balancing Reservoir.

The RWS is geographically delineated between the Hetch Hetchy Project and the Bay Area water system facilities. The Hetch Hetchy Project is generally composed of the reservoirs, hydroelectric generation and transmission facilities, and water transmission facilities from the Hetch Hetchy Valley west to the Alameda East Portal of the Coast Range Tunnel in Sunol Valley. The local Bay Area water system generally consists of the facilities west of Alameda East Portal, and includes the Alameda and Peninsula watershed reservoirs, two water treatment plants and the distribution system that delivers water to the SFPUC's Retail and Wholesale Customers.

2.1.2. Water Distribution

The subsections below provide details of the water distribution system of both the SFPUC RWS and the in-City distribution system.

Regional Water System: The RWS consists of more than 280 miles of pipeline and 60 miles of tunnels, 11 reservoirs, 5 pump stations, and 2 water treatment plants, and comprises three

regional water supply and conveyance systems: the Hetch Hetchy System, the Alameda System, and the Peninsula System.

- **Hetch Hetchy System.** In the Hetch Hetchy System, water is diverted from Hetch Hetchy Reservoir into a series of tunnels and aqueducts from the Sierra Nevada to the San Joaquin Pipelines that cross the San Joaquin Valley to the Coast Range Tunnel, which connects to the Alameda system at the Alameda East Portal.
- **The Alameda System.** The Alameda System includes two reservoirs, San Antonio Reservoir and Calaveras Reservoir, which collect water from the upper Alameda and San Antonio Creek watersheds in Alameda County plus conveyance facilities connecting the Hetch Hetchy System and Alameda water sources to the Peninsula System. These conveyance facilities include pipelines known as the Alameda Creek Siphons that connect the Coast Range Tunnel to the Irvington Tunnel.

  The Irvington Tunnel supplies the four Bay Division Pipelines (BDPLs) that cross the South Bay Area to the Peninsula System. BDPLs 1 and 2 cross the Bay near the Dumbarton Bridge; BDPLs 3 and 4 traverse the southerly edge of the Bay delivering water to SFPUC customers along the pipeline route. All four pipelines reconnect near the inlet to the Pulgas Tunnel on the Peninsula.

  The Sunol Valley Water Treatment Plant (SVWTP) filters and disinfects water supplied from San Antonio and Calaveras Reservoirs.

  Two turnouts from the South Bay Aqueduct (SBA) of the California State Water Project (SWP) can supply limited supplemental water to the SVWTP or San Antonio Reservoir. The SFPUC, however, currently does not possess entitlements to water from the State Water Project.
- **Peninsula System.** The Peninsula System includes conveyance facilities connecting the BDPLs to the in-City distribution system and to other SFPUC customers on the Peninsula. Two reservoirs, Crystal Springs and San Andreas, collect runoff from the San Mateo Creek watershed. Water from Pilarcitos Reservoir, on Pilarcitos Creek, directly serves one of the Wholesale Customers, the Coastside County Water District (which includes the City of Half Moon Bay), and can also deliver water to Crystal Springs and San Andreas Reservoirs. Water delivered from the BDPLs in excess of the Peninsula System and in-City demands spills into Crystal Springs and San Andreas Reservoirs. The Harry Tracy Water Treatment Plant (HTWTP) filters and disinfects water supplied from Crystal Springs and San Andreas Reservoirs before it is delivered to the Peninsula customers and the in-City distribution system.

In-City Distribution System: San Francisco's water system, the in-City distribution system, was originally developed during the 100-year period between 1860 and 1960, reflecting the patterns and rates of growth in the City. San Francisco's retail water supply is delivered to the City via several major pipelines. Two pipelines provide water to the eastern portion (eastside) of

the in-City distribution system and three pipelines serve the western portion (westside) of the in-City distribution system.

As shown in **Figure 2**, San Francisco's water system includes 10 reservoirs and 8 water tanks that store the water delivered by the Hetch Hetchy Project and the local Bay Area water system. The 17 pump stations[2] and approximately 1,250 miles of pipelines move water throughout the system and deliver water to homes and businesses in the City. Several major pipelines convey water from the Peninsula System to San Francisco. Water to the eastside of the City distribution system is fed by two pipelines that terminate at University Mound. Water to the westside distribution system is fed by two pipelines that terminate at Sunset Reservoir and one that terminates at Merced Manor Reservoir.

Figure 2: San Francisco Retail Water System Facilities

2.1.3. Water Treatment

The Hetch Hetchy Reservoir is the largest unfiltered water supply on the West Coast, and one of only a few large unfiltered municipal water supplies in the nation. The water originates from

[2] Does not include 3 pump stations on Treasure Island.

spring snow melt flowing down the Tuolumne River to Hetch Hetchy Reservoir, where it is stored. This pristine water source is located in the well-protected Yosemite National Park and meets or exceeds all federal and State criteria for watershed protection. The water originating from Hetch Hetchy Reservoir is protected in pipes and tunnels as it is conveyed to the Bay Area, and requires pH adjustment to control pipeline corrosion and disinfection for bacteria control. Based on the SFPUC's disinfection treatment practice, extensive bacteriological quality monitoring, and high operational standards, the U.S. Environmental Protection Agency (USEPA) and the State of California Department of Public Health (DPH) have determined that the Hetch Hetchy water source meets federal and State drinking water quality requirements without filtration, and thus the SFPUC is not required to filter water from Hetch Hetchy Reservoir.

All water derived from sources other than Hetch Hetchy Reservoir is treated at one of two treatment plants: (1) the SVWTP, which primarily treats water from the Alameda System reservoirs and has a peak capacity of 160 million gallons per day (mgd) and a sustainable capacity of 120 mgd; and (2) the HTWTP, which treats water from the Peninsula System reservoirs and has a peak capacity of 140 mgd and a sustainable capacity of 120 mgd.

Treatment processes at the SVWTP include coagulation, flocculation, sedimentation, filtration, and disinfection. Fluoridation, chloramination and corrosion control treatment are provided for the combined Hetch Hetchy Project and SVWTP water at the Sunol chloramination and fluoridation facilities. Treatment processes at the HTWTP include ozonation, coagulation, flocculation, filtration, disinfection, fluoridation, corrosion control treatment and chloramination.

A new ultraviolet (UV) treatment facility planned for the Hetch Hetchy System that enhances high water quality is a key component of the WSIP. The SFPUC's Advanced Disinfection Project will use UV light to disinfect Hetch Hetchy water to meet new federal requirements to control the waterborne parasite cryptosporidium. The Advanced Disinfection Project combines the construction of a new UV treatment facility with a new chemical water treatment building, an operations building, tanks, and other support structures. With a capacity of 315 mgd, the new UV water treatment facility will be the third largest in the United States. The new chemical storage and water treatment facilities will replace the existing 75-year-old structures, which do not meet current earthquake standards. Other major upgrades of the SVWTP and the HTWTP are also in progress. Construction is scheduled for completion of all of these projects in June 2012.

2.1.4. Water Storage

The majority of the water delivered by the SFPUC is supplied by runoff from the upper Tuolumne River watershed on the western slope of the central Sierra Nevada. Three major reservoirs collect runoff: Hetch Hetchy Reservoir, Lake Lloyd, and Lake Eleanor (**Table 1**). A water bank in New Don Pedro Reservoir is integrated into system operations. New Don Pedro Reservoir is jointly owned and operated by Modesto Irrigation District and Turlock Irrigation District (the Districts), and is located on the Tuolumne River downstream of the Hetch Hetchy System.

Water stored in Hetch Hetchy Reservoir is also used for hydroelectric generation and released downstream to satisfy instream flow requirements. Normally, only Hetch Hetchy Reservoir water supplies are exported to the Bay Area for municipal and industrial uses, and releases from Lake Eleanor and Lake Lloyd are used to satisfy instream flow requirements, satisfy Raker Act entitlements to the Districts downstream, and produce hydroelectric power. Water stored in New Don Pedro Reservoir is credited to the City's water bank account, which allows the City to meet its Raker Act water obligations to the Districts.

On the San Francisco Peninsula, the SFPUC utilizes Crystal Springs, San Andreas, and Pilarcitos Reservoirs located in San Mateo County to capture local watershed runoff. In the Alameda Creek watershed (in Alameda County), the SFPUC has operates Calaveras and San Antonio Reservoirs. In addition to using these facilities to capture runoff, San Andreas, San Antonio, and Crystal Springs Reservoirs also provide storage for Hetch Hetchy Project diversions, and, along with Calaveras, serve as an emergency water supply in the event of an interruption to Hetch Hetchy Project deliveries.

The SFPUC's Crystal Springs and Calaveras Reservoirs are currently operating under restrictions imposed by the Division of Safety of Dams (DSOD).

Table 1: Regional Water System Storage Capacity

Reservoir	Storage (Acre-feet)	Storage (Billions of Gallons)
Up-Country		
Hetch Hetchy	360,360	117.4
Lake Lloyd[1]	273,300	89.1
Lake Eleanor	27,100	8.8
Subtotal Up-Country	*660,760*	*215.3*
Local		
Calaveras (East Bay)[2]	96,800	31.5
San Antonio (East Bay)	50,500	16.5
Crystal Springs (Peninsula)	69,300	22.6
San Andreas (Peninsula)	19,000	6.2
Pilarcitos (Peninsula)	3,100	1
Subtotal Local[3]	*238,700*	*77.8*
Total Regional Water System[4]	**899,460**	**293.1**

Notes:

1. *Storage capacity shown includes flashboards, which are boards or structures of boards extending above a dam to increase its capacity.*
2. *Calaveras Reservoir was constructed with a storage capacity of 96,800 acre-feet. Since December 2001, in response to safety concerns about the seismic stability of the dam and a directive from DSOD, the SFPUC has held the maximum water level at approximately 37,800 acre-feet (roughly 40% of its maximum capacity), pending construction of a new comparably sized replacement dam downstream, scheduled for completion in 2015.*
3. *Two in-City reservoirs (Sunset and University Mound) are terminal storage for the RWS.*
4. *This includes 63,700 acre-feet in dead storage (i.e., the volume in a reservoir below the lowest controllable level). In addition, the SFPUC may draw against a credit of up to 570,000 acre-feet in storage in a water bank account with Don Pedro Reservoir, for total storage for planning purposes of 1,469,460 acre-feet.*

The in-City reservoirs and tanks have the capacity to hold approximately 413 million gallons of water. The SFPUC estimates this capacity to be a 5-day supply at the current average water consumption rate for the City. In addition, there is an emergency supply of existing non-potable water immediately available within the City at Lake Merced. Lake Merced currently holds approximately 1.5 billion gallons of water. **Table 2** summarizes the storage capacity of in-City reservoirs and storage tanks.

Table 2: In-City System Potable Water Storage Capacity

Reservoir	Millions of Gallons
Sunset	176.7
University Mound	140.9
Sutro	31.4
Summit	14
College Hill	13.5
Stanford Heights	12.9
Merced Manor	9.5
Lombard	2.7
Potrero	1
Hunters Point	1.1
Storage Tanks	9.3
Total	**413**

2.2 Service Area

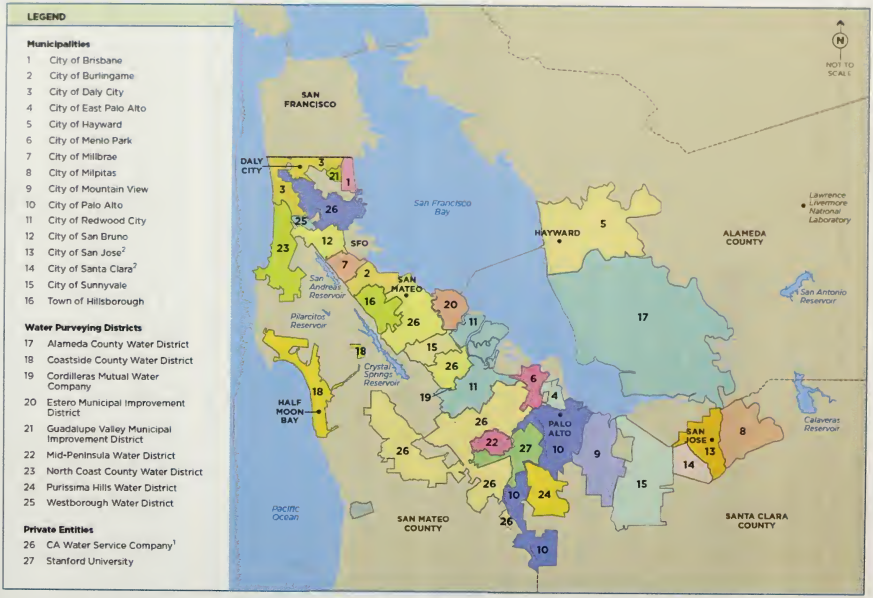
The SFPUC provides water to both Retail and Wholesale Customers. A population of nearly 2.5 million people within the counties of San Francisco, San Mateo, Santa Clara, Alameda, and Tuolumne rely entirely or in part on the water supplied by the SFPUC. Approximately 68% of the SFPUC's water supply is delivered to Wholesale Customers, and the remaining 32% is delivered to Retail Customers.

Retail Customers: The SFPUC's Retail Customers include the residents, businesses and industries located within the corporate boundaries of the City. Water service is also provided to customers located outside the City, such as the Town of Sunol, San Francisco International Airport, Lawrence Livermore National Laboratory, Castlewood, and Groveland Community Services District.[3]

Wholesale Customers: The SFPUC sells water to 27 Wholesale Customers (**Figure 3**) under terms of the *2009 Water Supply Agreement between the City and County of San Francisco and the Wholesale Customers in Alameda County, San Mateo County, and Santa Clara County,* together with individual water supply contracts. Since 1970, the SFPUC has supplied

[3] Although these customers are located outside of the corporate boundaries of the City, for the purposes of water billing and accounting, they are considered SFPUC's Retail Customers, as shown in **Table 12**

Figure 3: SFPUC Wholesale Customers



1. California Water Service Company, an investor-owned utility, provides water service to four separate districts: Bear Gulch (Atherton vicinity), San Carlos/San Mateo, South San Francisco and Skyline County Water District.
2. The SFPUC provides water on an interruptible basis to fixed service areas in the northern portions of the Cities of San Jose and Santa Clara

approximately 65% of the total Wholesale Customers' water demand. Some of the Wholesale Customers are entirely reliant on the SFPUC for their water supply.

2.3 Climate

San Francisco has a Mediterranean climate. Summers are cool and winters are mild with infrequent rainfall. Temperatures in the San Francisco area average 58 degrees Fahrenheit annually, ranging from the mid-40s in winter to the mid-70s in late summer. Strong onshore flow of wind in summer keeps the air cool, generating fog through September. The warmest temperatures generally occur in September and October. Rainfall in the San Francisco area averages about 20 inches[4] per year and is generally confined to the "wet" season from late October to early May. Except for occasional light drizzles from thick marine stratus clouds, summers are nearly completely dry.

The Wholesale Customers experience a climate similar to San Francisco, except for customers located in the southern and inland regions that tend to experience warmer temperatures in the summer months with less incidence of fog.

2.4 Retail Customer Demographic and Economic Trends

The retail water demand projections presented in this report are based on population and business trends forecast by the Association of Bay Area Governments (ABAG), the California Department of Finance, and the San Francisco Planning Department. ABAG's and Planning Department's projections are used in combination with an analysis of the characteristics of water use in the San Francisco retail service area to develop water demands.

The following provides demographic estimates and projections for the SFPUC's retail sector. This information is used as the basis for a detailed analysis of the SFPUC's retail water demand projections provided later in this document. A brief discussion of job growth and population estimates and projections for the SFPUC's Wholesale Customers is also included. Section 3 provides information on projected Retail and Wholesale Customer water demands.

Population: As shown in the table below, the current total population of San Francisco is estimated to be 856,095. The total population of San Francisco is projected to increase to 954,899 by year 2035, representing an average growth rate of 0.4% per year.

[4] 1971-2000 data from the two San Francisco monitoring stations (Mission Dolores/SF#047772 and Richmond/SF#047767). Source: www.wrcc.dri.edu.

Households, Household Population, and Household Size: San Francisco projects water use within its residential sectors using factors such as household population[5], households (occupied dwelling units), and persons per household (the household population divided by the number of households). These factors are important when projecting water use, which is based on end use of water within households. Population, household population, and housing trends for the 2010-2035 period are summarized in **Table 3**. Over the next 25 years, household units are projected to increase by approximately 0.7% per year. The majority of new housing will be multi-family units.

Table 3: San Francisco County Demographic Trends

Demographic	2010	2015	2020	2025	2030	2035
Population[1]	856,095	875,856	895,617	915,377	935,138	954,899
Household Population[2]	835,021	854,755	874,956	895,633	916,800	941,263
Household Units[3]	350,758	362,757	375,166	388,000	403,292	415,000
Single-Family Units[4]	110,759	112,109	113,475	114,857	116,257	117,674
Persons per Single-Family Household[5]	3.2	3.1	3.1	3.1	3.1	3.1
Multi-Family Units[6]	239,999	251.104	262,634	274,606	287,035	297,326
Persons per Multi-Family Household[5]	2.0	2.0	2.0	2.0	2.0	2.0

Notes:

1. *Population estimate for 2010 from California Department of Finance E-5 Housing and Population Estimates, dated May 2010. Population estimate for 2030 from ABAG Projections (2009). Population projections for 2015, 2020, and 2025 developed by interpolating between 2010 estimate and 2030 projection. 2035 projected by extrapolation.*
2. *Household population for 2010 based on Department of Finance E-5 Housing and Population Estimates, dated May 2010. The 2030 population estimate was taken from the Citywide Projections, dated July 2009. Household populations for 2015, 2020, and 2025 were interpolated using the 2010 and 2030 projections. The 2035 projection of population is based on the 2035 forecast of housing units assuming average persons per household are unchanged between 2030 and 2035.*
3. *Number of housing units for 2010 based on Department of Finance E-5 Housing and Population Estimates, dated May 2010. The 2030 housing unit estimate was taken from the Citywide Projections, dated July 2009. Housing unit projections for 2015, 2020, and 2025 were interpolated using the 2010 and 2030 projections. The 2035 projection of total housing units is taken from updated ABAG Projection 2009 developed as part of the Bay Area's Sustainable Communities Strategy (SCS), December 2010.*
4. *Single-family housing units in 2010 were set equal to the number of single-family residential accounts for those years. Single-family housing units for other years were interpolated using the average rate of single-family account growth from 1990 to 2010.*
5. *Updated persons per household projection derived from Census 2000 data and then scaled so that household population computed by multiplying the number of housing units by persons per household equaled the updated population projection. Projected persons per household were assumed to be the same in 2030 and 2035.*
6. *The number of multifamily housing units was calculated as the difference between the projection of total housing units and single-family housing units.*

Industrial and Commercial Businesses: The current number of people employed in San Francisco is estimated to be 544,056. This number is projected to increase to 698.790 by 2035, amounting to 1.01% growth per year over the next 25 years. **Table 4** shows the current and projected number of people employed in San Francisco.

[5] All persons living in individual housing units, not including persons who reside in places such as nursing homes, military facilities or rooming houses.

Figure 4 illustrates the current distribution of jobs among the various employment categories in San Francisco. The values have been delineated by job sectors as classified by Standard Industrial Classification (SIC) code. The majority of the job growth between now and 2035 is anticipated to occur in the construction and manufacturing sectors, as well as in the service sector.

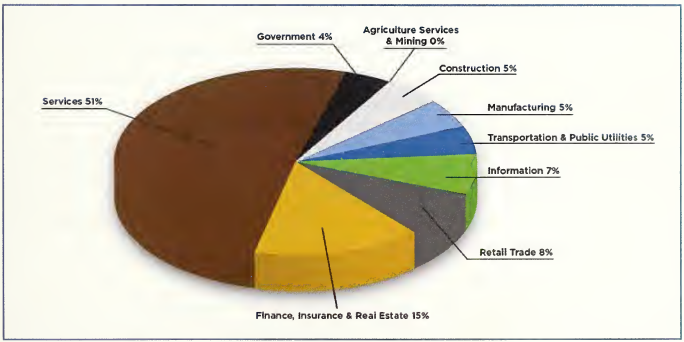
Table 4: San Francisco County Number of Jobs in Industrial and Commercial Businesses1

Job Sector Category	2010	2015	2020	2025	2030	2035
Agricultural Services and Mining	1,020	958	944	927	907	953
Construction	27,060	27,606	29,444	32,316	34,687	36,448
Manufacturing	25,760	26,845	29,546	31,434	33,709	35,421
Transportation & Public Utilities	28,150	27,202	27,741	27,433	27,531	28,929
Information	36,860	36,877	38,497	41,436	43,932	46,163
Retail Trade	45,000	44,983	47,281	53,165	56,067	58,913
Finance, Insurance, Real Estate	79,720	78,722	82,594	87,836	91,918	96,585
Services	276,086	302,434	318,149	330,775	349,050	366,769
Government	24,400	24,093	24,862	26,469	27,229	28,611
Total	**544,056**	**569,720**	**599,060**	**631,790**	**665,030**	**698,790**

Notes:

1. Based on updated ABAG Projection 2009 developed as part of the Bay Area's Sustainable Communities Strategy, December 2010.

Figure 4: Number of Jobs in Industrial and Commercial Businesses, San Francisco County 2010



2.5 Wholesale Customer Population & Job Growth Estimates

Table 5 provides estimates and projections of population for the Wholesale Customer service area. The population for the Wholesale Customers is expected to increase over the next 25 years. During this period, employment in the Wholesale Customer service area is projected to increase from 1,145,843 (2010) to 1,665,743 (2035). Water demands were determined by applying the growth rate in population and employment to the applicable water accounts. Section 4.3 provides information on projected Wholesale Customer water demands.

Table 5: Wholesale Population Estimates and Projections

Wholesale Customers [1]	2010	2015	2020	2025	2030	2035
Total Population	1,745,292	1,819,263	1,906,202	1,982,976	2,054,820	2,124,854
Total Employment	1,145,843	1,242,146	1,355,199	1,455,465	1,559,154	1,665,743

Notes:

1. *Estimates and projections from BAWSCA 2009 Water Conservation Implementation Plan. ABAG (2007) population and employment projections were primarily used as a basis for projections.*

Section 3: System Supplies

This section summarizes current and projected SFPUC water supplies and describes the various sources of water supplies available to meet the retail and wholesale water demands. This section also summarizes the options used, or being considered, by the SFPUC to maximize resources and minimize the need to import water from the RWS watersheds.

3.1 SFPUC Regional Water Supply Sources

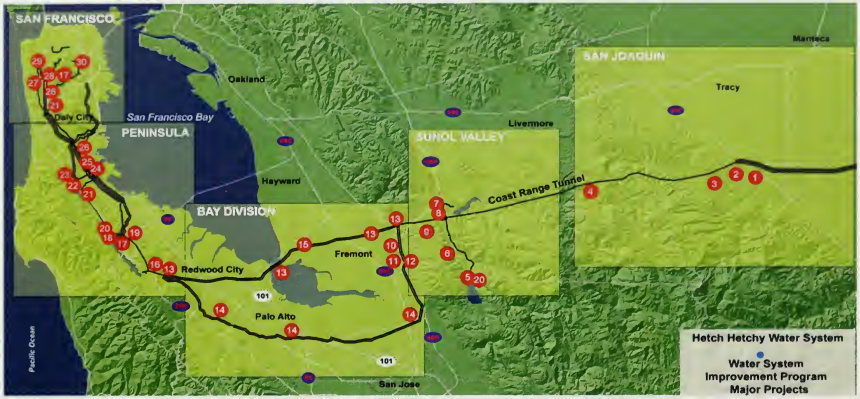
The SFPUC serves its retail and wholesale water demands with an integrated operation of local Bay Area water production and imported water from the Hetch Hetchy Project. The local watershed facilities are operated to conserve local runoff for delivery. Water demands that are not met by local runoff are met with water diverted from the Tuolumne River through the Hetch Hetchy Project. On average, the Hetch Hetchy Project provides over 85% of the water delivered by the SFPUC. During drought, the water received from the Hetch Hetchy Project can amount to over 93% of the total water delivered.

The amount of water available to the SFPUC is constrained by hydrology, physical facilities, and the institutional parameters that allocate the water supply of the Tuolumne River. Due to these constraints, the SFPUC is very dependent on reservoir storage to maximize the reliability of its water supplies. More importantly, reservoir storage provides water supply carry-over capability. During dry years, the SFPUC has a very small share of Tuolumne River runoff available and the local Bay Area watersheds produce very little water. Reservoir storage is critical during drought cycles because it enables the SFPUC to carry-over water supply from wet years to dry years.

3.1.1. SFPUC Water System Improvement Program

To enhance the ability of the SFPUC water system to meet the service goals for water quality, seismic reliability, delivery reliability, and water supply, the SFPUC is undertaking the WSIP. The WSIP is a 4.6 billion dollar, multi-year, capital program to upgrade the RWS. The program will deliver improvements that enhance the SFPUC's ability to provide reliable, affordable, high-quality drinking water to its Wholesale Customers and Retail Customers in an environmentally sustainable manner. **Figure 5** lists the WSIP projects and their locations. The goals and objectives of the WSIP are presented in **Table 6**.

Figure 5: SFPUC Water System Improvement Program (WSIP)



1. San Joaquin Pipeline System
2. Rehabilitation of Existing San Joaquin Pipelines
3. Tesla Treatment Facility
4. Lawrence Livermore Water Quality Improvement
5. Calaveras Dam Replacement
5. Calaveras Reservoir Upgrades
5. San Antonio Backup Pipeline
6. SVWTP Expansion & Treated Water Reservoir
7. Upper Alameda Creek Filter Gallery
8. Alameda Siphon #4
8. San Antonio Pump Station Upgrade
9. New Irvington Tunnel
10. BDPL No. 4 Condition Assessment PCCP Sections
11. Seismic Upgrade of BDPL Nos. 3 & 4
12. BDPL Nos. 3 & 4 Crossover/Isolation Valves
13. BDPL Reliability Upgrade - Tunnel
13. BDPL Reliability Upgrade - Pipeline
13. BDPL Reliability Upgrade - Relocation of BDPL Nos. 1 & 2
14. BDPL Nos. 3 & 4 Crossovers
15. SFPUC / EBMUD Intertie
16. Pulgas Balancing - Inlet/Outlet Work
16. Pulgas Balancing - Discharge Channel Modifications
16. Pulgas Balancing - Structural Rehabiliation & Roof Replacement
16. Pulgas Balancing - Modifications of the Existing Dechlorination Facility
17. Crystal Springs Pipaline No. 2 Replacement
18. Lower Crystal Springs Dam Improvements
19. New Crystal Springs Bypass Tunnel
20. Adit Leak Repair - Crystal Springs/Calaveras
21. Crystal Springs/San Andreas Transmission Upgrade
22. HTWTP Long-Term Improvements
23. HTWTP Short-Term Improvements - Demo Filters
23. HTWTP Short-Term Improvements - Coagulation & Flocculation/Remaining Filters
24. Capuchino Valve Lot Improvements
25. Peninsula Pipelines Seismic Upgrade
26. Baden and San Pedro Valve Lots Improvements
27. Regional Groundwater Storage and Recovery
28. San Andreas Pipeline No. 3 Installation
29. Sunset Reservoir - North Basin
30. University Mound Reservoir - North Basin

WSIP Project In Various Locations

- Standby Power Facilities - Various Locations
- Pipeline Repair & Readiness Improvements
- SCADA System - Phase II
- System Security Upgrades
- Cross Connection Controls
- Programmatic EIR
- Habitat Reserve Program
- Watershed Environment Improvement Program

Table 6: WSIP Goals and Objectives

Program Goal	System Performance Objective
Water Quality – *maintain high water quality*	• Design improvements to meet current and foreseeable future federal and state water quality requirements. • Provide clean, unfiltered water originating from Hetch Hetchy Reservoir and filtered water from local watersheds. • Continue to implement watershed protection measures.
Seismic Reliability – *reduce vulnerability to earthquakes*	• Design improvements to meet current seismic standards. • Deliver basic service to the three regions in the service area (East/ South Bay, Peninsula, and San Francisco) within 24 hours after a major earthquake. Basic service is defined as average winter-month usage, and the performance objective for the regional system is 215 mgd. The performance objective is to provide delivery to at least 70% of the turnouts in each region, with 96, 37, and 82 mgd delivered to the East/South Bay, Peninsula, and San Francisco, respectively. • Restore facilities to meet average-day demand within 30 days after a major earthquake.
Delivery Reliability – *increase delivery reliability and improve ability to maintain the system*	• Provide operational flexibility to allow planned maintenance shutdown of individual facilities without interrupting customer service. • Provide operational flexibility to minimize the risk of service interruption due to unplanned facility upsets or outages. • Provide operational flexibility and system capacity to replenish local reservoirs as needed. • Meet the estimated average annual demand of 300 mgd for 2030 under the conditions of one planned shutdown of a major facility for maintenance concurrent with one unplanned facility outage due to a natural disaster, emergency, or facility failure/upset.
Water Supply – *meet customer water needs in non-drought and drought periods*	• Meet average annual water purchase requirements of 300 mgd from Retail and Wholesale Customers during non -drought years for system demands through 2030. • Meet dry-year delivery needs through 2030 while limiting rationing to a maximum 20% system-wide reduction in water service during extended droughts. • Diversify water supply options during non-drought and drought periods. • Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers.
Sustainability – *enhance sustainability in all system activities*	• Manage natural resources and physical systems to protect watershed ecosystems. • Meet, at a minimum, all current and anticipated legal requirements for protection of fish and wildlife habitat. • Manage natural resources and physical systems to protect public health and safety.
Cost-effectiveness – *achieve a cost-effective, fully operational system*	• Ensure cost-effective use of funds. • Maintain gravity-driven system. • Implement regular inspection and maintenance program for all facilities.

3.1.2. Phased WSIP Variant

As required under the California Environmental Quality Act (CEQA), the San Francisco Planning Department prepared a Program Environmental Impact Report (PEIR) for the WSIP. The PEIR evaluated the potential environmental impacts of the proposed WSIP projects and identified potential mitigations to those impacts. The PEIR also evaluated several alternatives to meet the SFPUC service area's projected increase in water demand between now and 2030. The water supply improvement options investigated included 10 alternatives using various water supply combinations from the local watersheds; the Tuolumne and Lower Tuolumne River; ocean desalination; and additional recycled water, groundwater, and conservation. The PEIR was certified by the San Francisco Planning Commission on October 30, 2008. On the same day, the SFPUC adopted the Phased WSIP Variant option in Resolutions No. 08-200.

At the request of the SFPUC, the San Francisco Planning Department studied the Phased WSIP Variant as part of the environmental analysis. The SFPUC identified this variant to consider a program scenario that involved full implementation of all proposed WSIP facility improvement projects to achieve public health, seismic safety, and delivery reliability goals as soon as possible, but phased implementation of a water supply program to meet projected water purchases through 2030. Deferring the 2030 water supply element of the WSIP until 2018 would allow the SFPUC and its Wholesale Customers to focus first on implementing additional local recycled water, groundwater, and demand management actions while minimizing additional diversions from the watersheds.

The Phased WSIP Variant establishes a mid-term planning milestone in 2018 when the SFPUC would reevaluate water demands through 2030 in the context of then-current information, analysis, and available water resources. The SFPUC has historically made annual average deliveries ranging from 285 mgd in 1987 to 265 mgd in 2005 from local watersheds (Peninsula and Alameda Creek) and the Tuolumne River Watershed. Annual average deliveries in 2005 provided the baseline year for the Phased WSIP. The Phased WSIP Variant would meet the projected 2018 purchase requests of 285 mgd from the RWS by capping purchases from the watersheds at 265 mgd; the remaining 20 mgd would be met through water efficiencies and conservation, water recycling and local groundwater use: 10 mgd by Wholesale Customers and 10 mgd in the City. Before 2018, the SFPUC and the Wholesale Customers will engage in a new planning process to reevaluate water system demands and supply options, including conducting additional studies and environmental reviews necessary to address water supply needs after 2018.

The Phased WSIP Variant includes the following water supply elements:

- Water supply delivery to RWS customers through 2018 only of 265 mgd average annual target delivery originating from the watersheds. This includes 184 mgd for the Wholesale Customers and 81 mgd for Retail Customers.
- Water supply sources include 265 mgd average annual from the Tuolumne River and

local watersheds and 20 mgd of water conservation,[6] recycled water and local groundwater developed within the SFPUC's service area (10 mgd Retail; 10 mgd Wholesale);

- Water supply projects to meet dry-year demands with no greater than 20% system-wide rationing in any one year:
    - Restoration of Calaveras Reservoir capacity;
    - Restoration of Crystal Springs Reservoir capacity;
    - Westside Basin Groundwater Conjunctive Use;
    - Water Transfer with Modesto Irrigation District (MID) / Turlock Irrigation District (TID); and
- Reevaluation of 2030 demand projections, potential RWS purchase requests, and water supply options by December 31, 2018 and a separate SFPUC decision in 2018 regarding RWS water deliveries after 2018.

3.1.3. Future Regional Supplies

In addition to the supply options discussed above, the SFPUC is exploring a range of additional options to improve water supply reliability in future years for the purposes of managing the water supply loss associated with instream flow release requirements (discussed further in Section 5). In adopting the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements Project, the SFPUC committed to providing instream flow releases below Calaveras Dam and Lower Crystal Springs Dam, as well as bypass flows below Alameda Creek Diversion Dam. The instream flow release requirements for Alameda Creek and San Mateo Creek represent a potential decrease in available water supply of an average annual 3.9 mgd and 3.5 mgd, respectively, for a total of 7.4 mgd average annually.[7] These instream flow release requirements could potentially create a shortfall in meeting the SFPUC demands of 265 mgd and slightly increase the SFPUC's dry year water supply needs. If a shortfall occurs, it is anticipated at the completion of construction of both the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements Project in approximately 2015 and 2013, respectively, when the SFPUC will be required to provide instream flow releases.

The SFPUC is committed to meeting its contractual obligation to its Wholesale Customers of 184 mgd until 2018 and its delivery reliability goal of 265 mgd with no greater than 20% rationing in any one year of a drought.

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[6] Water conservation is accounted for as a demand reduction.

[7] This water supply decrease assumes the adopted WSIP program element of an average annual target delivery of 265 mgd. The analysis also assumes that all of the water supply components of the adopted WSIP are implemented and all WSIP projects are implemented, including the Upper Alameda Creek Filter Gallery project, which in accordance with the Program Environmental Impact Report (PEIR) assumptions is estimated to recapture up to 6300 acre-feet (AF) per year (5.6 mgd).

The following actions are currently being considered:

- Development of additional conservation and recycling
- Development of additional groundwater supply
- Water transfer from MID and/or TID
- Increase in Tuolumne River supply
- Revising the Upper Alameda Creek Filter Gallery Project capacity
- Development of a desalination project

These other future supplies have been included with projected RWS supplies to offset the instream flow release requirements, maintaining a total of 265 mgd from the RWS watersheds through 2035.

3.1.4. Summary of RWS Supplies

As discussed above, deliveries from the RWS watersheds are limited to an average annual of 265 mgd through 2018. As a decision on future water deliveries beyond 2018 has not yet been made, the 2010 UWMP assumes that the 265 mgd supply limitation extends to 2035.

Table 7: SFPUC RWS Supplies to Retail and Wholesale Customers in Normal Years

SFPUC RWS Watersheds (mgd)[1]	2010	2015	2020	2025	2030	2035
Retail Customers	81.0	81.0	81.0	81.0	81.0	81.0
Wholesale Customers	184.0	184.0	184.0	184.0	184.0	184.0
TOTAL (mgd)	265.0	265.0	265.0	265.0	265.0	265.0

Notes:

1. *The RWS watershed supply reflects a 7.4-mgd reduction in total regional system supplies due to instream flow release requirements beginning in 2015, offset by other future supplies to be developed.*

3.2 SFPUC Retail Water Supply Sources

The RWS provides more than 97% of the City's retail water supplies. A small portion (less than 3%) of the retail water demand is met through locally produced groundwater and secondary treated recycled water.

3.2.1 Local Groundwater

San Francisco overlies all or part of seven un-adjudicated groundwater basins. These groundwater basins include the Westside, Lobos, Marina, Downtown, Islais Valley, South, and Visitation Valley basins. The Lobos, Marina, Downtown and South basins are located wholly within the City limits, while the remaining three extend south into San Mateo County. The portion of the Westside Basin aquifer located within San Francisco is referred to as the North Westside Basin. With the exception of the Westside and Lobos basins, all of the basins are

generally inadequate to supply groundwater for municipal supply due to low yield, contamination or potential subsidence concerns.

Early in its history, San Francisco made use of local groundwater, springs, and spring-fed surface water. By 1913, it was estimated that San Francisco was using approximately 8.5 mgd of groundwater from private and City wells, springs, and Lobos Creek, which is fed by springs. Prior to the completion of Calaveras Reservoir on Alameda Creek, part of the City's water supply was also from Lake Merced, which was significantly spring-fed at the time. Lake Merced was substantially lowered by diversions in the 1920s and early 1930s, the latter as a result of diverting from the lake for emergency water supply during drought conditions from 1929 to 1932.

In the 1930's, the Sunset well field was installed on the west side of San Francisco and groundwater was extracted for a short period of time, from late 1930 through mid-1935. Pumping rates were reported to be up to 6 mgd. After imports of water from the Hetch Hetchy Reservoir began in October, 1934, the municipal water supply system began to rely almost exclusively on surface water from the Alameda and Peninsula watersheds and from the Hetch Hetchy Water and Power Project.

Local groundwater use, however, has continued in the City. Since 1926, groundwater has been pumped from wells located in Golden Gate Park and the San Francisco Zoo. Based on flow meter data, about 1.5 mgd is produced by these wells. The groundwater is mostly used in the Westside Groundwater Basin by the City's Recreation and Park Department for irrigation in Golden Gate Park and at the Zoo. These wells are located in the North Westside Groundwater Basin. DWR has not identified this basin as overdrafted, or as projected to be overdrafted in the future. There is currently no adopted groundwater management plan for the SFPUC's groundwater basins.

About 0.7 mgd of groundwater is delivered to the Castlewood community in Pleasanton from a well field operated by the SFPUC. This groundwater is drawn from the Central Groundwater Sub Basin in the Livermore/Amador Valley. DWR has not identified this basin as over-drafted, nor as projected to be over-drafted in the future. These wells are metered and have been in operation for several decades. The system serving Castlewood is not connected to the RWS.

3.2.2 Local Recycled Water

The following summarizes the quantity and quality of wastewater generated and disposed of in the retail system, and the past and current use of recycled water.

Wastewater Generation, Collection, Treatment, and Disposal: San Francisco's wastewater collection, treatment, and disposal system consists of a combined sewer system (which collects both sewage and storm water), three water pollution control plants (WPCPs) and outfalls to San Francisco Bay and the Pacific Ocean. The collection and conveyance system consists of approximately 900 miles of various sizes of underground sewer pipes, transport/storage structures, and pump stations located throughout the City. Two of the City's water pollution

control plants, the Southeast WPCP and Oceanside WPCP, provide secondary treatment and operate year-round, while the third plant, the North Point WPCP, operates only during wet weather and provides primary treatment. Ultimate disposal of treated wastewater effluent is currently through outfalls to both San Francisco Bay and the Pacific Ocean. **Table 8** and **Table 9** summarize the actual and projected volumes of San Francisco wastewater collected, treated and discharged to the Bay and Ocean.

Table 8: Wastewater Collection and Treatment

Wastewater	2005	2010	2015	2020	2025	2030	2035
Collected & treated (mgd)	106.9	96.0	98.1	96.3	95.8	96.7	98.2
Volume that will meet recycled water standard (mgd)	0	0	2	4	4	4	4

Table 9: Disposal of Wastewater (non-recycled)

Disposal & Treatment Method	2010	2015	2020	2025	2030	2035
Secondary Effluent to Deep Water Outfalls (mgd)	80.3	82.5	80.6	80.1	81.0	82.6
Secondary Effluent to Islais Creek (mgd)	5.7	5.7	5.7	5.7	5.7	5.7
Primary Effluent to Deep Water Outfalls (mgd)	9.9	9.9	9.9	9.9	9.9	9.9
Total (mgd):	96.0	98.1	96.3	95.8	96.7	98.2

Past and Current Recycled Water Use: From 1932 to 1981, the City's McQueen Treatment Plant, using an activated sludge process, provided recycled water to Golden Gate Park for irrigation and flow augmentation of its streams and lakes. Due to changes in State regulations, the plant could no longer meet standards, and the City closed the McQueen plant and discontinued use of recycled water in Golden Gate Park.

In 1991, the San Francisco Board of Supervisors passed Ordinances 390-91 and 391-91 that outline specific components to be addressed in a Recycled Water Master Plan (RWMP), designate recycled water use areas within San Francisco, and require the installation of dual-plumbing systems for recycled water use within the designed recycled water use areas for the following situations:

- New or remodeled buildings and all subdivisions with a total area of 40,000 square feet or more
- New and existing irrigated areas of 10,000 square feet or more

The SFPUC first developed a RWMP that outlined a phased water recycling project for San Francisco in 1996. However, the Plan was not implemented due to limited funding. An updated RWMP was subsequently completed in 2006. The 2006 RWMP identifies recycled water project alternatives and a plan for implementation of recycled water projects in the City. These projects

will help the City meet its long-term water demands with a local resource in a more reliable and sustainable manner.

Currently, recycled water use in San Francisco is limited, but the SFPUC is moving forward with expanding the use within the City. Disinfected secondary-treated recycled water from the SFPUC's Southeast WPCP is used on a limited basis for wash-down operations, and is provided to construction contractors for soil compaction and dust control and other nonessential construction purposes. Current use of recycled water for these purposes does not materially contribute to reducing the retail demands.

3.3 Future Retail Water Supply Sources

To reliably and sustainably meet the future water needs of its Retail Customers, the SFPUC is diversifying its water supply portfolio through the development of local water supplies such as increasing recycled water and groundwater production. Projects related to these efforts are described below.

3.3.1 San Francisco Groundwater Supply Project

The San Francisco Groundwater Supply Project proposes the construction of up to six wells and associated facilities in the western part of San Francisco to extract up to 4 mgd of groundwater from the Westside Basin for distribution in the City. The extracted groundwater, which would be used both for regular and emergency water supply purposes, would be disinfected and blended with imported surface water before entering the municipal drinking water system. The environmental review for this project began in December 2009. Construction is expected to be complete by 2015.

3.3.2 Recycled Water Supply Projects

Recycled water projects being developed in San Francisco (retail service area) are the Harding Park, Pacifica, and proposed Westside and Eastside Recycled Water Projects. These projects would provide up to 4 mgd of recycled water to a variety of users in San Francisco – primarily for landscape irrigation, toilet flushing, and industrial purposes – and are detailed below.

- The Harding Park Recycled Water Project would use available recycled water from the North San Mateo County Sanitation District (NSMCSD) located in Daly City, to irrigate Harding Park and Fleming Park golf courses in San Francisco. The SFPUC has partnered with the NSMCSD for this proposed project. The Harding Park Project has completed environmental review and design. Construction has begun and will be completed in June 2012.
- The Pacifica Recycled Water Project will provide recycled water to irrigate the Sharp Park Golf Course in Pacifica (which is owned by the City) and other nearby areas. When completed, the project will save approximately 40 million gallons of drinking water each

year. SFPUC has partnered with the North Coast County Water District on this project. Construction has begun and will be completed by December 2011.

- The proposed Westside Project would construct a tertiary recycled water plant and associated pipelines to replace surface and groundwater currently used to irrigate Golden Gate Park, Lincoln Park and Golf Course, and the Presidio Golf Course. Additionally recycled water would be used for various non-potable uses in Golden Gate Park, including those at the California Academy of Sciences. The environmental review process was initiated with the release of the Notice of Preparation in September 2010.
- Currently, the SFPUC is conducting a recycled water demand assessment of potential users and uses in the Eastside of San Francisco. The assessment is examining the potential uses of recycled water for irrigation, toilet flushing, and various commercial and industrial applications. The WSIP contains funding for planning, design, and environmental review for the proposed Eastside Recycled Water Project.

In addition, the planned Candlestick Point-Hunters Point Shipyard Phase II, Treasure Island-Yerba Buena Island, and Parkmerced development projects may include the development of recycled water to help offset potable demand. These new projects could produce up to 1.5 mgd of recycled water. This represents additional recycled water supply and has not been included as part of SFPUC's local supplies. In the event that recycled water is produced at the project sites, recycled water could offset as much as 1.5 mgd in total San Francisco retail potable water demand.

Regional Recycled Water Planning Efforts: The SFPUC is working with local agencies to develop recycled water projects that will benefit the SFPUC and local partners by reducing demands for SFPUC regional system water, and/or freeing up groundwater that could be used for potable supplies. In addition, these projects would reduce wastewater discharges into San Francisco Bay and the Pacific Ocean.

- The SFPUC, the Cities of South San Francisco and San Bruno, and California Water Service Company (Bayshore District) are jointly pursuing a project to produce and distribute recycled water in the South San Francisco and San Bruno areas. Recycled water for the project will be produced at the South San Francisco/San Bruno Water Quality Control Plant jointly operated by the Cities of South San Francisco and San Bruno.
- The SFPUC is also exploring opportunities to partner with Daly City on a recycled water expansion project and with Redwood City to provide recycled water to the Menlo Country Club.

Additional regional recycled water partnership opportunities with other Bay Area agencies will be evaluated as opportunities arise.

The SFPUC is a member of the Bay Area Clean Water Agencies (BACWA) Recycled Water Committee. BACWA is composed of Bay Area wastewater agencies that discharge into the San Francisco Bay estuary. The purpose of the Recycled Water Committee is to further regional water recycling efforts from a wastewater agency perspective. The SFPUC is currently serving as the Chair of this committee.

The City is also an active member of the International, California Section, and Northern California Chapter of the WateReuse Association. The international organization is dedicated to increasing the amount of recycled water produced and used in a beneficial and efficient manner in the United States and abroad. The California Section focuses on promoting this mission in California.

3.3.3 Proposed Actions to Encourage Use of Recycled Water

To encourage the use of recycled water in San Francisco, the City adopted Ordinances 390-91 and 391-91.[8] As mentioned previously, these ordinances require the installation of dual-plumbing systems within a specific geographic area for the following situations:

- New or remodeled buildings and all subdivisions with a total of 40,000 square feet or greater, for uses such as irrigation, toilet flushing, and industrial processes
- New and existing landscaped areas of 10,000 square feet or larger, for irrigation

The City also passed Ordinance 175-91,[9] which requires the use of non-potable water for soil compaction and dust control for construction and demolition projects.

The SFPUC also initiated a Large Landscape Grant Program in 2009. Retail Customers in San Francisco with 2.5 acres or more of irrigated landscapes are eligible to apply. Grant funding is available for water-saving and recycled water retrofits that reduce potable water use for landscape irrigation.

3.3.4 Recycled Water Optimization Plan

As mentioned in the above section, the San Francisco Board of Supervisors passed Ordinances 390-91 and 391-91, which require the installation of dual-plumbing systems in buildings and subdivisions and landscaped areas within a specific geographic area. In addition, Ordinance 175-91 was also passed requiring the use of non-potable water for soil compaction and dust control for construction and demolition projects.

Also, as discussed previously in Section 3.2.2, the 2006 RWMP identifies recycled water project alternatives and a plan for implementation of recycled water projects in the City. The SFPUC is

[8] San Francisco Public Works Code, Article 22, Sections 1200-1210. Note that this Ordinance was amended in 1994 by Ordinance 393-94, which expanded the designated recycled water use area to include Treasure Island, Yerba Buena Island, and Hunters Point Shipyard.

[9] San Francisco Public Works Code, Article 21, Sections 1100-1107.

working with retail customers located outside San Francisco to develop recycled water projects that will benefit the SFPUC and local partners by reducing demands for SFPUC Regional System water, and/or freeing up groundwater that could be used for potable supplies. In addition, these projects would reduce wastewater discharges into San Francisco Bay and the Pacific Ocean. Examples of these projects are described below.

Table 10 summarizes the current and projected uses of recycled water in San Francisco, assuming the proposed projects described above are developed.

Table 10: Recycled Water Uses: Current and Projected

Use Type[1]	2005[2]	2010[2]	2015	2020	2025	2030	2035
Irrigation (mgd)[3]	0	0	1.68	2.68	2.68	2.68	2.68
Lake Fill (mgd)[4]	0	0	0.4	0.4	0.4	0.4	0.4
Com/Ind (mgd)[5]	0	0	0	1.0	1.0	1.0	1.0
Total (mgd)	**0**	**0**	**2.08**	**4.08**	**4.08**	**4.08**	**4.08**

Notes:

1. *Indirect potable reuse has been evaluated and determined to be economically infeasible at this time.*
2. *2005 and 2010 reflect actual values.*
3. *Includes landscape irrigation. Demand for agricultural irrigation for the SFPUC's retail service area is negligible, and therefore economically infeasible.*
4. *Includes wildlife habitat enhancement, wetland recharge, and groundwater recharge.*

3.3.5 Summary of Current and Future Retail Water Supplies

Table 11 provides a breakdown of current and projected water supply sources for meeting SFPUC retail water demand over the next 25 years.

Table 11: SFPUC Retail Water Supplies 2010 – 2035 (Normal Year)

Current and Future Water Supply Sources	2010	2015	2020	2025	2030	2035
RWS Watersheds – Retail Supply[1]	**81**	**81**	**81[1]**	**81[1]**	**81[1]**	**81[1]**
Groundwater Sources[2]						
In-City Irrigation Purposes	1.5	0.3	0.3	0.3	0.3	0.3
Groundwater at Castlewood and Sunol	0.7	0.7	0.7	0.7	0.7	0.7
Treated for Potable (previously used for in-City irrigation purposes)	0.0	1.2	1.2	1.2	1.2	1.2
Groundwater Subtotal	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**
Future Water Supply Sources						
Groundwater: Potable from North Westside Groundwater Basin	0.0	2.8	2.8	2.8	2.8	2.8
Recycled Water Expansion Irrigation[2]	0.0	2.0	4.0	4.0	4.0	4.0
Future Supply Subtotal	**0.0**	**4.8**	**6.8**	**6.8**	**6.8**	**6.8**
Total Supply	**83.2**	**88.0**	**90.0**	**90.0**	**90.0**	**90.0**

Notes:

1. *Assumes 2018 supply limitation extends to 2035.*
2. *Groundwater currently serves irrigation to Golden Gate Park, the San Francisco Zoo, and the Great Highway median. A groundwater reserve of 0.3 mgd for irrigation purposes will remain as part of the SFPUC's non-potable groundwater supply (SFPUC 2008 Phased WSIP Variant). Castlewood and Sunol projected supplies remain unchanged over the 20-year planning horizon.*

3.4 Water Quality

As discussed previously, the SFPUC's retail demand is primarily met with water from the RWS watersheds, with a small portion (less than 3%) from local groundwater supplies and recycled water. Each of these sources delivers high-quality water relative to its intended use. Supplies from the RWS are extremely high quality, used for both potable and non-potable uses. Existing groundwater and recycled water supplies are currently used for non-potable applications.

It has been assumed in this UWMP that these existing supplies will be available in the future. The SFPUC does not anticipate that future, water quality issues will alter the SFPUC's current water management strategies or supply reliability. This section provides information on the water quality of the SFPUC's existing retail water supplies.

3.4.1 Quality of Regional Water System Supplies

The SFPUC RWS watersheds deliver high-quality water. The current surface water supplies available to the RWS include the Tuolumne River and supplies from local Bay Area reservoirs. The majority of the water supply originates in the upper Tuolumne River watershed high in the Sierra Nevada, remote from human development and pollution. This pristine water, referred to as Hetch Hetchy water, is protected in pipes and tunnels as it is conveyed to the Bay Area, requiring only primary disinfection and pH adjustment to control corrosion in the pipelines.

The USEPA and the DHS have approved the use of this drinking water source without requiring filtration at a treatment plant. However, local water from the Alameda and Peninsula Watersheds requires filtration to meet drinking water quality requirements. The filtered and treated water from the local watersheds is blended with Hetch Hetchy water, and most customers receive water from a blended source. System water quality, including both raw water and treated water, is continuously monitored and tested to assure that water delivered to customers meets or exceeds federal and State drinking water/public health requirements.

The SFPUC will continue to rely on these high-quality water sources. No degradation of water quality is anticipated in the future.

3.4.2 Quality of Local Water Supplies

Quality of local groundwater and recycled water supplies is discussed in the following paragraphs.

Groundwater Supplies: Based on semi-annual monitoring, the groundwater currently used for irrigation and other non-potable uses in San Francisco meets or exceeds the quality needed for

these end uses.

Plans for development of additional groundwater in San Francisco include plans for potable supply in the North Westside Groundwater Basin. As part of this effort, the groundwater quality at new proposed well sites is being sampled for all drinking water parameters. The groundwater would be disinfected and blended with imported surface water before entering the municipal drinking water system. Based on information collected to date, the water quality of this blended water would meet drinking water standards.

Recycled Water Supplies: Recycled water in San Francisco is currently being used on a limited basis for in-plant wash-down purposes. This recycled water undergoes secondary treatment at SFPUC's Southeast Water Pollution Control Plant and meets the Title 22 California Code of Regulation requirements for recycled water use for non-potable uses.

Recycled water projects being developed in San Francisco (retail service area) are the Harding Park, Pacifica, and proposed Westside and Eastside recycled water projects. These projects would provide up to 4 mgd of recycled water to a variety of users in San Francisco primarily for landscape irrigation and toilet flushing. This recycled water will undergo tertiary treatment, which will result in water quality sufficient to meet the needs and requirements associated with each end use.

Section 4: System Demands

This section focuses on the projection of the SFPUC's water demands. Retail demands are based on recent demographic information and a detailed analysis of the SFPUC's retail water use characteristics. Wholesale Customer demands for SFPUC supplies are based on projections developed by Wholesale Customers. This section also presents the baseline and target per capita water consumption rate, as required by SB X7-7.

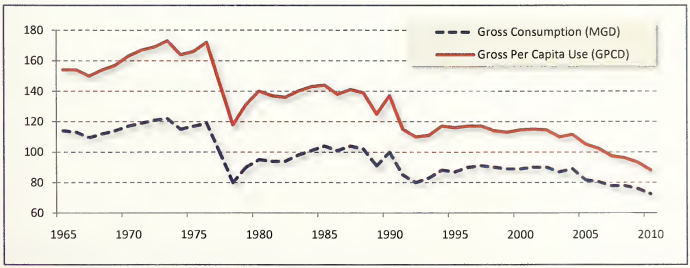
4.1 Retail Water Demands

Water use within San Francisco is currently below historic consumption. Both the total consumption and the per capita use of water have been on a general decline in San Francisco since the mid-1970s. Many factors have contributed to this reduction in water use, including significant changes to the mix of industrial and commercial businesses and their associated water demand, and the general characteristics of water use by San Francisco water customers. In particular, the severe droughts of 1976-77 and 1987-92, changes in plumbing codes, and conservation programs (either voluntarily embraced by residents and businesses or mandated by San Francisco), have apparently affected water demands.

Figure 6 shows the historical record of retail water deliveries by San Francisco for the 1965 through 2010 period in terms of both total deliveries and gross per capita consumption (gallons per capita per day, or gpcd).

While the gross per capita consumption is not a true measure of the water used by an individual (since it includes water use by all categories of customers, e.g., industrial, commercial and losses), it does provide insight when comparing water use among regions. The current per capita consumption rate by San Francisco in-City water customers is 85.6 gpcd, one of the lowest in the state.

Figure 6: Historical San Francisco Water Consumption



4.1.1 Current Retail Demand

All of the SFPUC's Retail Customers have been metered since 1916. In 2010, total SFPUC retail water use was 77.7 mgd. Of this demand, in-City Retail Customers used approximately 71 million gallons per day (mgd) [10]. Water use by suburban Retail Customers totaled approximately 4.1 mgd, and groundwater irrigation use was approximately 2.2 mgd.

Water use in 2010 was lower than expected. This decreased demand can be attributed to three main reasons. First, the very wet spring and cool summer California experienced in 2010 depressed urban water demand across the state. Second, 2008 and 2009 were both dry and the SFPUC asked its customers to reduce their water consumption by 10%. While rainfall returned to normal or above normal in 2010, the reductions in water use have continued. Third, the sharp economic decline which started in 2008 pushed down commercial and industrial demands. When preparing the 2005 UWMP, the number of jobs in 2010 was projected to be 692,420. According to the 2010 estimates from the California Employment Development Department, the number of jobs in 2010 was closer to 545,000.

Residential Water Use: Single-family units comprise approximately 32% of the total households in San Francisco, and use approximately 40% of the total water delivered to the residential sector. The remainder of residential water (60%) is used by multi-family units such as apartments.

Combined, the single-family and multi-family residential sectors have a current per capita consumption rate of approximately 50 gpcd. Due to San Francisco's moderate climate and high density housing, residential water use is used almost entirely indoors. For multi-family units, the average outdoor water use is considered negligible. Outdoor water use makes up less than 10% of single-family residential uses, on average.

Non-residential Water Use: Non-residential water use accounts for approximately 30% of San Francisco's retail water demands. This includes all sectors of water users not designated as residential, such as manufacturing, transportation, trade, finance, and government employment sectors, and the large services sector.

Unaccounted for Water Loss: Unaccounted for Water Loss represents both unbilled authorized consumption (including metered high pressure fire fighting consumption, unmetered main flushing, street cleaning and dust control and low pressure fire hydrant use) and unbilled unauthorized consumption (including water lost to the system through all types of leaks, breaks and overflows). These losses are assumed to be approximately 6.9% of total in-City demand. Meter under-registration is also considered unbilled unauthorized consumption and is captured in the demand calculations for each billing sector. It is assumed that meter under-registration is 2.2% of residential demand and 2.1% of non-residential demand. Total loss in the City due to meter under-registration, unbilled authorized consumption and unbilled unauthorized consumption is approximately 9% of in-City demand.

[10] This only refers to in-City retail demand, not total retail demand (which includes Retail Customers outside of the city and county boundary, such as Lawrence Livermore National Laboratory), and this does not include groundwater.

4.1.2 Projected Retail Water Demands

Projected water use for the SFPUC's in-City Retail Customers was estimated using the City's Retail Water Use Models. The models were first developed in 2004 and updated in 2010. These models have incorporated economic and demographic forecast data, including projections of population, housing stock and employment. These forecast data were based on the ABAG reports *Projections 2002*, *Projections 2009*, and *Draft Projections 2011* (developed as part of the Bay Area's Sustainable Communities Strategy). These reports summarize demographic projections for the City at 5-year intervals as well as California Department of Finance estimates and projections 10-year intervals. These projections were reviewed and refined by the San Francisco Planning Department using up-to-date planning information for the City.

Results of the water demand forecasts show that SFPUC's in-City retail water demand will only slightly increase (**Table 12**), even though the household population in San Francisco is expected to increase by nearly 12% for the same period (year 2010 through year 2035). The projected increase in in-City retail water demands is due to estimated growth in business and industry, which will translate into a commensurate increase in water use. The expected increase in water use in the non-residential sector, however, is expected to be partially balanced by decreases in water use in the residential sector.

The decreased water use forecast for the residential sectors is attributed primarily to market penetration of current plumbing codes within the residential sectors. Market penetration will increase as time progresses, resulting in an increase in water savings due to the installation of more water-efficient fixtures.

A decrease in water use can also be expected, in both the residential and non-residential sectors, as a result of water conservation programs. The SFPUC has increased its water conservation programs in an effort to achieve new water savings by 2018. The SFPUC's conservation program is based on the SFPUC Retail Demand Model Update and Calibration Technical Memorandum (The Demand Study) (**Appendix D**), which identified water savings and implementation costs associated with a number of water conservation and efficiency measures. The Demand Study evaluated the costs and benefits of implementing various conservation measures using an end-use model. These estimates include new conservation programs such as high-efficiency toilet replacement in low-income communities and water-efficient irrigation systems for large irrigators (e.g., in municipal parks and commercial landscaping). Through its conservation program, the SFPUC anticipates reducing gross per capita consumption to 82 gpcd by 2020 for an average daily savings of approximately 6 mgd.[11] Demand reduction due to local conservation is accounted for in the demand projection shown in **Table 12**.

[11] Per capita estimates were calculated based on household population. SBX7-7 per capita estimates contained in Section 4.1.5 were calculated based on the total population data obtained from the Department of Finance.

Table 12: San Francisco Retail Water Demands

Water Use Entity	2005 [1] (mgd)	2010 [1] (mgd)	2015 (mgd)	2020 (mgd)	2025 (mgd)	2030 (mgd)	2035 (mgd)
In-City Customers							
Single-Family Residential [2]	18.4	16.4	17.9	17.1	16.5	16.0	15.8
Multi-Family Residential [2]	27.7	25.1	28.9	28.4	28.2	28.3	28.6
Non Residential [2]	24.8	23.5	25.6	26.5	27.5	28.7	29.9
Other In-City Demands [2,3]	0.2	0.1	0.2	0.2	0.2	0.2	0.2
Losses [4]	8.2	6.3	5.0	4.9	5.0	5.0	5.1
In-City Subtotal [5]:	**79.3**	**71.4**	**77.7**	**77.1**	**77.3**	**78.2**	**79.7**
In-City Subtotal w/ Conservation [6]:	**79.3**	**71.4**	**73.5**	**71.7**	**71.3**	**72.0**	**73.7**
Suburban Retail Customers [7]							
Other Retail Customers [8]	4.4	3.0	3.8	3.8	3.8	3.8	3.8
Lawrence Livermore Lab	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Groveland CSD	0.4	0.7	0.8	0.8	0.8	0.8	0.8
Suburban Retail Subtotal:	**5.2**	**4.1**	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**
Groundwater Customers							
City Irrigation Uses [9]	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Castlewood & Sunol Golf Course [10]	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Groundwater Subtotal:	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**
Total Retail Demand [11]:	***86.7***	***77.7***	***80.7***	***78.9***	***78.5***	***79.2***	***80.9***

Notes:

1. *2005 and 2010 data are based an actual billing data (SFPUC, 2010). 2015-2035 are projectians fram the SFPUC Retail Demand Madel Update and Calibration Technical Memarandum (March 2011).*
2. *Water demands reflect the adjusted demand, taking into cansideratian the potential savings due ta plumbing cades.*
3. *Builders and Contractars, Docks & Shipping*
4. *Lasses reparted far 2005 and 2010 include meter under-registratian. Lasses in 2015 – 2035 exclude meter under-registration because they are included in the retail demand projections far residential and nan-residential sectars. Meter under-registration lasses estimated at 2.2% af residential and 2.1% af nan-residential sectar demands. System lasses excluding meter under-registration estimated at 6.86% af sector demand.*
5. *"In-City subtatal" refers ta demand that includes cade-driven savings fram changes in state and federal plumbing cades and regulatians.*
6. *"In-City Subtotal with Canservatian" refers ta demand that includes cade-driven savings plus savings fram SFPUC-initiated canservatian programs.*
7. *Suburban retail custamer future demands da nat include active canservatian savings. The SFPUC plans an warking with the suburban Retail Custamers an canservatian activities, but has nat yet quantified the savings. Accardingly, demands are kept constant thraugh 2035, but will be adjusted as mare infarmatian becames available.*
8. *The San Francisca Caunty Jail, San Francisca Internatianal Airpart, and ather suburban or municipal accaunts.*
9. *Irrigatian at Galden Gate Park, the Great Highway median, and the San Francisca Zaa.*
10. *100% af Castlewaad demand (0.4 mgd) is met by graundwater wells in Pleasanton and 75% af Sunal Galf caurse demand (0.3 mgd) met by subsurface diversions af surface water at the Sunal Filter Galleries. Projected demands are based an average use fram 2000-2010 and remain unchanged over the 25 year planning harizan.*
11. *This refers ta the sum af "in-City subtatal with canservatian", suburban retail subtatal, and graundwater subtatal.*

4.1.3 Non-residential Water Demands

Average employee-use rates, gallons per employee-day (GED), have been estimated for the various employment categories in the development of the end-use study. These values range from approximately 18 GED for the government category to approximately 94 GED for the agriculture and mining category.

Table 13 provides a breakdown by industry type of the SFPUC's projected water demands for the retail non-residential sector for 2005 through 2035 in 5-year increments.

Table 13: SFPUC Projected Retail Non-Residential Water Demands

Industry[1]	2005 (mgd)	2010 (mgd)	2015 (mgd)	2020 (mgd)	2025 (mgd)	2030 (mgd)	2035 (mgd)
Ag. & Mining	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Construction	0.5	0.5	0.5	0.6	0.6	0.7	0.7
Manufacturing	2.0	2.1	2.1	2.4	2.5	2.7	2.8
Transportation	0.7	0.6	0.6	0.6	0.6	0.6	0.7
Information	1.5	1.5	1.5	1.6	1.7	1.8	1.9
Retail Trade	2.5	2.4	2.4	2.5	2.9	3.0	3.2
F.I.R.E.[2]	1.5	1.5	1.4	1.5	1.6	1.7	1.8
Services	15.7	15.4	16.9	17.8	18.5	19.5	20.5
Government	0.5	0.4	0.4	0.5	0.5	0.5	0.5
Total without Conservation[3]	**25.0**	**24.6**	**26.1**	**27.5**	**29.0**	**30.5**	**32.1**
Total with Conservation	**24.8**	**23.5**	**25.6**	**26.5**	**27.5**	**28.7**	**29.9**

Notes:

1. *Projections from the SFPUC Retail Demand Model Update and Calibration Technical Memorandum.*
2. *FIRE = finance, insurance, and real estate.*
3. *Totals calculated using gallon-per-day equivalents (GED) and employment estimates and projections and do not include passive or active conservation savings.*

4.1.4 Water Demands of Lower Income Households

The retail water demand projections presented in **Table 12** include all demands of existing and planned lower-income housing. Based on the Official State Income Limits for 2010, published by the State of California Department of Housing and Community Development Division of Housing Policy Development, the median household income in San Francisco County is $99,400. In 2010, the average household size was 2.4 persons. Based on the Official State Income Limits for 2010, lower income limits for 2.0 and 3.0 person households are $68,800 and $77,400, respectively. Taking a weighted average, this corresponds to an income limit of $72,043. Based on census data for San Francisco County between 2007 and 2009, approximately 43% of households have an average annual income below $72,043. As shown in **Table 14**, current and projected lower income demands were estimated to be approximately 43% of the total water demands presented in **Table 12**.

Table 14: Water Demands of Lower-Income Households

Water Use Entity	2005	2010	2015	2020	2025	2030	2035
Total In-City Retail Demands (mgd)[1]	79.3	71.4	73.5	71.7	71.3	72.0	73.7
Lower Income Demands (mgd)[2,3]	34.0	30.6	31.5	30.8	30.6	30.9	31.6

Notes:

1. *"In-City retail" demand for single-family residential and multi-family residential. This does not include demands from Retail Customers that are outside the City boundary, such as Lawrence Livermore National Laboratory.*
2. *Water demand is calculated by multiplying the estimated percentage of lower income household numbers by the corresponding in-City retail demands from Table 12.*
3. *The SFPUC has always included lower income households as part of the overall city demand in its planning efforts, and all demands presented in Section 4 include lower income demands. Updates to the Urban Water Management Planning Act require that entities separately calculate the water demands for lower income households in this UWMP, and this table reflects the SFPUC's best effort to do so. Please note that the SFPUC does not use these numbers for any planning purposes.*

4.1.5 Methodology Used to Project Retail Water Demands

The SFPUC uses disaggregated end-use models to project its retail water demands. San Francisco's water demand is segregated into three distinct categories of water use: non-residential (industrial, commercial and municipal uses); multi-family residential (e.g. townhouses and apartments); and single-family residential. The remainder of San Francisco's water demands such as unaccounted for water and minor uses such as docks and shipping are forecast through trend analysis.

Future non-residential water use is projected using relationships between employment within San Francisco and employee use of water. These coefficients are segregated by type of business or service enterprise, which is based on SIC codes. Appropriate employee-use rates within San Francisco's model were determined by extensive review of industry literature.

Two separate end-use models estimate multi-family and single family residential water use. These models rely on a disaggregation of household end-use of water, such as the number and volume of toilet flushes, duration of showering, and the size and frequency of use of washing machines and dishwashers. These data were derived from available residential end-use monitoring studies. [12]

The models have been verified with water delivery records for historical periods, including periods of time when water demands were affected by drought-induced rationing programs. Water use projections through the year 2035 were developed using these models. The water use projections incorporate the effects of water-saving plumbing code requirements, among other factors. **Appendix D** contains a detailed discussion of the methodology.

[12] End- use studies include the Residential End Uses of Water Study (American Water Works Association Research Foundation, 1999) and the California Single-Family Water Use Efficiency Study (Prepared by Aquacraft, Inc. with Stratus Consulting & the Pacific Institute. Sponsored by the California Department of Water Resources, Draft Final April 2011).

4.1.6 Differences between 2005 and 2010 Water Demand Projections

Although the SFPUC used the same methodology to project retail water demands in the 2005 UWMP, a few key assumptions were updated in the models used for the 2010 UWMP, resulting in lower projected water demands. The SFPUC Retail Demand Model Update and Calibration Technical Memorandum in Appendix D contains a detailed description of these changes. **Table 15** contains a summary of these key changes.

Table 15: Updated Demand Model Assumptions

Updated Assumptions	Changes from 2005
Population, housing, and employment projections	Since the 2005 UWMP, new population, employment and housing projections were released. Updates were primarily based on data obtained from Association of Bay Area Governments (ABAG), California Department of Finance, and the City's Planning Department. The updated projections resulted in increased water demands in the multi family sector in 2030 due to a projected increase of 37,081 households. However, the revised projections decreased the employment projections in 2030 by 130,370 jobs, which resulted in decreased water demands in the non-residential sector.
Water Loss	The model was updated to more accurately account for water loss due to meter under-registration. The original model specification included water losses due to customer meter under-registration, both within each billing sector's projected water demand and as a component of the Unaccounted-for-Water causing the model to overestimate in-City retail demands.
Conservation Savings	The original model projected 4.5 mgd of active water conservation savings by 2030. The suite of conservation measures included in the 2004 model was updated to better reflect the mix of conservation measures and technologies that the SFPUC expects to implement in the near future. Additionally savings from new regulations were added into the model, including the City's 2009 Retrofit on Resale (ROR) ordinance, the phase-in of high-efficiency toilet standards under AB 715, California Energy Commission's (CEC) proposed efficiency standards for residential clothes washers, and California's and the City's green building standards. These changes resulted in 2.0 mgd of additional conservation savings.
Other Retail Customer Demands	The demands associated with "other Retail Customers" were updated to reflect a decrease in water use over the past 10 years by these customers. Additionally the groundwater demands of Castlewood and Sunol were removed from this category as these demands are already captured under the groundwater demands.
City Irrigation Demands	City Irrigation demands were updated based on new data. In 2005, City irrigation demands were projected to be 2.5 mgd. Based on the latest metered data, city irrigation demands have been decreased to 1.5 mgd.

The changes summarized above result in decrease in demand of nearly 9.0 mgd in 2030 between the 2005 UWMP and the 2010 UWMP. The 2005 UWMP did not project 2035 demands.

4.2 Per Capital Water Use: Baseline and Target

SBx7-7 (California Water Code section 10608 [e]) requires the SFPUC to include the following in its UWMP.

- Baseline daily per capita water use: how much water is used within an urban water supplier's distribution system area on a per-capita basis. It is determined using water use and population estimates from a defined range of years.
- Urban water use target: how much water is planned to be delivered in 2020 to each resident within an urban water supplier's distribution system area, taking into account water conservation practices that currently are and plan to be implemented.
- Interim urban water use target: the planned daily per capita water use in 2015, a value halfway between the baseline daily per capita water use and the urban water use target.

In 2015 and 2020, the SFPUC will report on daily per capita water use to assess progress toward meeting the interim and 2020 urban water use targets developed herein.

4.2.1 Baseline Daily Per Capita Water Use

As described in *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use (For the Consistent Implementation of the Water Conservation Act of 2009)*, the Water Conservation Bill of 2009 requires each urban retail water supplier to include in its UWMP an estimate of base daily per capita water use, expressed in gpcd, for a continuous multiyear base period. The Water Code specifies two different base periods for calculating Base Daily Per Capita Water Use:

- A 10- to 15-year continuous period used to calculate baseline per capita water use per Section 10608.20.
- A continuous 5-year period used to determine whether the 2020 per capita water use target meets the legislation's minimum water use reduction requirement per Section 10608.22.

Because the SFPUC's current and past recycled water use is minimal (<1 mgd; much less than the 10% of 2008 water use needed to justify a 15-year baseline), the SFPUC will utilize a 10-year baseline. Water use data from fiscal year (FY) 2000/01 to FY 2009/10 have been used for this analysis.

Base Daily Per Capita Water Use has been calculated for the 10-year period as follows:

Step 1: Estimate distribution system area

Step 2: Estimate Service Area Population for each year in the base period

Step 3: Calculate Gross Water Use for each year in the base period (in gallons/day)

Step 4: Calculate Annual Daily Per Capita water use for each year in the base period by dividing Gross Water Use by Service Area Population

Step 5: Calculate Base Daily Per Capita Water Use as the average per capita water use

Step 1: Estimate Distribution System Area (10-Year Baseline). The distribution system area is the SFPUC's In-City Retail System, shown in **Figure 7**.

Figure 7: Distribution System Area and Metering Locations

Step 2: Estimate Service Area Population for Base Period (10-Year Baseline). As shown in **Table 16**, the retail population was developed for the period from FY 00/01 to FY 09/10 based on Department of Finance total population data for the City and County of San Francisco (2000 – 2009).

Step 3: Calculate Gross Water Use (10-Year Baseline). Gross water use for the City is provided in **Table 16**. Gross water use was developed by compiling water from the SFPUC's own sources delivered to Retail Customers (total production minus deliveries to Wholesale Customers). Changes in in-City storage were then factored in to develop gross water use. The SFPUC compiles daily flow data for the County-line meters, System Input and In-Line Meters, and daily reservoir water level data. The meters, water level sensors, and associated metering equipment are all inspected, tested, calibrated, and maintained according to the applicable meter calibration and maintenance frequency by an independent metering consultant. These include annual pitot tube tests, quarterly secondary meter equipment testing and calibration, cleaning, flushing, inspecting, and lubricating. The flow quantities are expected to be accurate and no meter error adjustment is necessary. Gross water use is shown in rows 1 through 5 in **Table 16**.

Step 4: Calculate Annual Daily Per Capita Water Use (10-Year Baseline). Annual Daily Per Capita Water Use was calculated by dividing gross water use by population. Annual Daily Per Capita Water Use is shown on the last row in **Table 16.**

Step 5: Calculate Base Daily Per Capita Water Use (10-Year Baseline). Base Daily Per Capita Water Use is calculated as the average of per capita water use, or 98.4 gpcd.

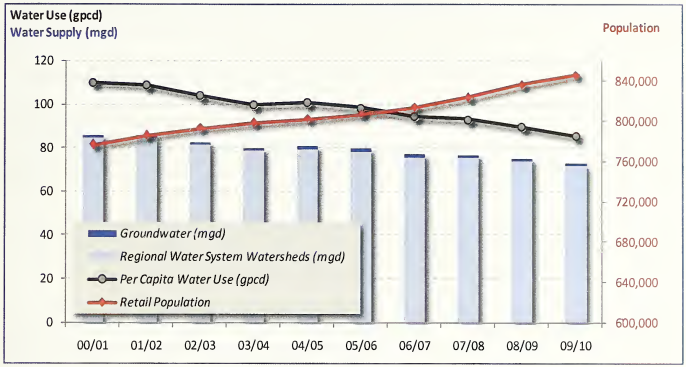
Table 16: SFPUC Gross Water Use from FY 00/01 to FY 09/10 (mgd)

	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Own Sources[1]	85.4	85.4	82.5	79.6	80.6	79.4	76.8	76.7	75.0	72.5
Imported Sources	0	0	0	0	0	0	0	0	0	0
Volume Exported	0	0	0	0	0	0	0	0	0	0
Change in Storage	-0.01	0.00	0.15	0.02	-0.09	0.00	0.03	0.00	-0.01	0.06
Gross Water Use	***85.4***	***85.4***	***82.3***	***79.6***	***80.7***	***79.4***	***76.8***	***76.7***	***75.0***	***72.4***
Retail Population[2]	776,733	785,654	793,462	798,574	802,512	807,382	813,929	823,940	836,360	846,601
Per Capita Use (gpcd)[3]	***110.0***	***108.7***	***103.8***	***99.6***	***100.6***	***98.3***	***94.3***	***93.1***	***89.7***	***85.6***

Notes:

1. *All sources are metered, and all meters are calibrated annually.*
2. *Population data from California Department of Finance for City and County of San Francisco (http://www.dof.ca.gov/research/demographic/reports/estimates/e-5/2001-10/view.php), 2000-2001 / 2008-2009.*
3. *Per capita water use has been calculated in compliance with the requirements of the Water Conservation Bill of 2009.*

Figure 8: SFPUC 10-Year Retail Gross Water Use



4.2.2 Urban Water Use Target

The SFPUC has elected to use Method 3 of the four approved methods provided for by the Water Conservation Bill of 2009 for determining urban water use targets. The SFPUC retail distribution system is contained entirely within the San Francisco Bay hydrologic region. The hydrologic region baseline, interim, and 2020 targets are 157, 144, and 131 gpcd, respectively. To calculate the SFPUC urban water use targets using Method 3, 95% of the interim and 2020 targets are calculated, yielding interim and 2020 urban water use targets of 136.8 and 124.5 gpcd, respectively.

4.2.3 Confirmation of Urban Water Use Target

California Water Code Section 10608.22 requires confirmation of the base daily per capita water use using a 5-year base period to assure that the use target meets a minimum threshold. The 5-year continuous base period is to end no earlier than December 31, 2007, and no later than December 31, 2010. The SFPUC has used the 5-year period from FY 05-06 to FY 09/10 for calculation of the 5-year baseline.

Calculation of Base Daily Per Capita Water Use for the 5-year period is calculated in the same way as for the 10-year period (see above):

Step 1b: Estimate distribution system area

Step 2b: Estimate Service Area Population for each year in the base period

Step 3b: Calculate Gross Water Use for each year in the base period (expressed in

gallons per day)

Step 4b: Calculate Annual Daily Per Capita water use for each year in the base period by dividing Gross Water Use by Service Area Population

Step 5b: Calculate Base Daily Per Capita Water Use as the average per capita water use

Each calculation step for determining Base Daily Per Capital Water Use for the 5-year period is shown below.

Step 1: Estimate Distribution System Area (Five-Year Baseline). The distribution system area is the SFPUC's In-City retail distribution system, shown previously in **Figure 7**.

Step 2: Estimate Service Area Population for Base Period (5-Year Baseline). As shown in **Table 17**, the retail population was developed for the period from FY 00/05 to FY 09/10 based on Department of Finance total population data for the City and County of San Francisco (2005 – 2009).

Step 3: Calculate Gross Water Use (5-Year Baseline). Gross water use for the City of San Francisco is provided in **Table 17**. As discussed previously, gross water use was developed by compiling water from the SFPUC's own sources delivered to Retail Customers (total production minus deliveries to Wholesale Customers). Changes in in-City storage were then factored in to develop gross water use.

The SFPUC compiles daily flow data for the County-line meters, System Input and In-Line Meters, and daily reservoir water level data. The meters, water level sensors, and associated metering equipment are all inspected, tested, calibrated, and maintained according to the applicable meter calibration and maintenance frequency by an independent metering consultant. These include annual pitot tube tests, quarterly secondary meter equipment testing and calibration, cleaning, flushing, inspecting, and lubricating. The flow quantities are expected to be accurate and no meter error adjustment is necessary.

Step 4: Calculate Annual Daily Per Capita Water Use (5-Year Baseline). Annual Daily Per Capita Water Use was calculated by dividing gross water use by population. Annual Daily Per Capita Water Use is shown on the last row in **Table 17**.

Step 5: Calculate Base Daily Per Capita Water Use (5-Year Baseline). Base Daily Per Capita Water Use is calculated as the average of per capita water use, or 92.2 gpcd.

Table 17: SFPUC Gross Water Use from FY00/05 to FY09/10

	05/06	06/07	07/08	08/09	09/10
Own Sources (mgd)[1]	79.4	76.8	76.7	75.0	72.5
Imported Sources (mgd)	0	0	0	0	0
Volume Exported (mgd)	0	0	0	0	0
Change in Storage (mgd)	0.00	0.03	0.00	-0.01	0.06
Gross Water Use (mgd)	***79.4***	***76.8***	***76.7***	***75.0***	***72.4***
Retail Population[2]	807,382	813,929	823,940	836,360	846,601
Per Capita Use (gpcd)[3]	***98.3***	***94.3***	***93.1***	***89.7***	***85.6***

Notes:

1. *All sources are metered, and all meters are calibrated annually.*
2. *Population data from California Department of Finance for City and County of San Francisco (http://www.dof.ca.gov/research/demographic/reports/estimates/e-5/2001-10/view.php), 2005 - 2009.*
3. *Per capita water use has been calculated in compliance with the requirements of the Water Conservation Bill of 2009.*

The SFPUC's Base Daily Per Capita Water Use for the 5-year period from 05/06 to 09/10 is 92.2 gpcd. Because this is below 100 gpcd, no adjustments to the urban water use target are needed (California Water Code Section 10608.22).

4.2.4 Water Use Reduction Plan

The SFPUC's current Base Daily Per Capita Water Use is 92.2 gpcd, which is below both the interim and 2020 urban water use targets of 136.8 and 124.5 gpcd, respectively; therefore, the SFPUC is already in compliance with the requirements of the Water Conservation Bill of 2009.

Although it is already in compliance with the Water Conservation Bill, the SFPUC remains committed to implementing conservation as an important component of its water supply portfolio, and will continue its efforts to minimize retail water demands through conservation. In 2010, the SFPUC conducted a detailed analysis on the effectiveness of its water conservation measures. The analysis projected a total savings potential of 5.0 mgd by 2018 and 6.0 mgd by 2035 from active conservation. Detail of the analysis is documented in the SFPUC Retail Demand Model Update and Calibration Technical Memorandum (**Appendix D**), which was developed as part of the 2011 Retail Water Conservation Plan. This Plan is intended to serve as a living document that will be reviewed and updated periodically as part of the SFPUC's adaptive management approach.

4.3 Wholesale Water Demands

The SFPUC provides water to 27 Wholesale Customers in San Mateo, Alameda and Santa Clara Counties under contractual agreements. These entities receive over two-thirds of the SFPUC's RWS watershed supply. Of the 27 Wholesale Customers (Figure 3), 14 derive 100% of their water from the SFPUC.

4.3.1 Wholesale Water Contractual Obligations and Demands

The following sections describe the various water supply contracts and other contractual obligations that the SFPUC has entered into with its Wholesale Customers.

1984 Settlement Agreement and Master Water Sales Contract: Between 1984 and 2009, the SFPUC provided water to its Wholesale Customers under the terms of the 1984 Settlement Agreement and Master Water Sales Contract (1984 Agreement). The 1984 Agreement created a total "Supply Assurance" of 184 mgd (measured on an annual average basis) for 25 of the Wholesale Customers. The Cities of San Jose and Santa Clara are served wholesale water on an interruptible basis and such sales are not deemed to be within the Supply Assurance. The Supply Assurance is not a guarantee of water delivery in every year, but may be reduced due to emergencies, water shortages, drought, or system maintenance and repair. Of the 25 Wholesale Customers within the Supply Assurance, 24 have Individual Supply Guarantees (ISG) within the 184 mgd. The City of Hayward does not have an ISG because it had previously negotiated a permanent, all requirements individual. The City of Hayward continues to receive water under a contract entered into in 1960 with no expiration date or limitation in supply. Under the 184 mgd Supply Assurance, the 24 Wholesale Customers with ISGs would be required to reduce their allocation to accommodate the needs of the City of Hayward in the event that Hayward's water use exceeds its estimated share of the Supply Assurance.

2009 Water Supply Agreement: The 1984 Agreement expired on June 30, 2009. In July 2009, the SFPUC entered into the Water Supply Agreement (WSA) with the Wholesale Customers. The WSA continues the existing 184 mgd Supply Assurance. The WSA includes an "Interim Supply Limitation", which limits water sales to Retail and Wholesale Customers from the RWS watersheds to 265 mgd through 2018 based upon the water supply variant adopted by the SFPUC in its approval of the WSIP in Res. No. 08-200. Under the Interim Supply Limitation, Retail Customers receive 81 mgd and the Wholesale Customers receive 184 mgd from the RWS. The 184 mgd Interim Supply Limitation includes 9 mg of demand allocated to the Cities of San Jose and Santa Clara, but both cities retain their temporary, interruptible status.

As part of the implementation of the Interim Supply Limitation, on December 14, 2010 the SFPUC established each individual Wholesale Customer's share of the Interim Supply Limitation., referred to as "Interim Supply Allocations" (ISAs – see SFPUC Res. No. 10-0213). The ISAs are effective until December 31, 2018 and do not affect the Supply Assurance or the ISGs. The ISGs and ISAs are listed in **Table 18**.

Environmental Enhancement Surcharge: If combined sales to Wholesale and Retail Customers exceed the Interim Supply Limitation of 265 mgd, the SFPUC will impose an Environmental Enhancement Surcharge on Retail Customers if sales exceed 81 mgd and on individual Wholesale Customers whose purchases exceed their ISAs. As described in Section 4.04 of the WSA, the SFPUC plans to establish the Environmental Enhancement Surcharge concurrently with the budget-coordinated rate process to be effective for water sales in FY

2011/12 through 2017/18. The SFPUC is in the process of developing the methodology and amount of this volume-based charge.

2018 Water Supply Decisions: Subject to completion of necessary CEQA review and the exercise of retained discretion by the SFPUC to reject or modify proposed projects, the new WSA requires the SFPUC to make the following decisions by December 31, 2018:

- Whether to make San Jose and Santa Clara permanent customers, to the extent that the SFPUC determines that long-term water supplies are available.
- Whether to provide water in excess of the supply assurance to meet wholesale demands through the year 2030, and whether to offer a corresponding increase in the supply assurance.

Wholesale Demands: **Table 18** and **Table 19** show the demands of the Wholesale Customers on the SFPUC RWS. Table 18 shows the unrestricted purchase projections of the Wholesale Customers through 2035 assuming the 265 mgd supply limitation from the RWS watersheds ends in 2018. **Table 19** shows the wholesale customer demands for the same time period, assuming the 265 mgd supply limitation extends beyond 2018.

Table 18: SFPUC Wholesale Customer Water Demands[1]

Wholesale Customer	ISG[2]	ISA[3]	2005	2010	2015	2020	2025	2030	2035
Alameda County Water District	13.76	13.76	10.80	10.81	13.76	13.76	13.76	13.76	13.76
City of Brisbane / Guadalupe Valley Municipal Improvement District	0.98	0.96	0.68	0.58	0.98	1.02	1.04	1.06	1.07
City of Burlingame	5.23	4.97	4.52	3.93	4.69	4.84	4.94	5.05	5.24
California Water Service Company	35.68	35.68	34.83	32.57	33.70	31.73	32.43	33.16	33.91
Coastside County Water District	2.18	2.18	1.75	1.82	2.18	2.18	2.18	2.18	2.18
Cordilleras Mutual Water Association	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
City of Daly City	4.29	4.29	6.94	3.21	4.29	4.29	4.59	4.89	5.37
City of East Palo Alto	1.96	1.96	2.02	1.81	2.44	2.84	3.30	3.30	3.35
Estero Municipal Improvement District	5.90	5.85	5.21	4.9	5.70	5.30	5.40	5.40	5.90
City of Hayward	22.08	22.92	18.51	17.25	22.00	23.60	25.80	28.10	30.70
Town of Hillsborough	4.09	3.72	3.37	2.97	3.72	4.09	4.09	4.09	4.09
City of Menlo Park	4.46	4.1	3.38	3.04	3.96	4.13	4.44	4.62	4.46
Mid-Peninsula Water District	3.89	3.71	3.30	2.87	3.70	3.80	3.80	3.90	3.89

Wholesale Customer	ISG[2]	ISA[3]	2005	2010	2015	2020	2025	2030	2035
City of Millbrae	3.15	3.13	2.43	2.24	3.20	3.30	3.30	3.40	*3.41*
City of Milpitas	9.23	8.96	6.67	6.28	7.07	7.69	8.25	8.80	*8.90*
City of Mountain View[4]	13.46	11.43	10.53	8.95	11.43	13.46	13.46	13.46	13.46
North Coast County Water District	3.84	3.67	3.42	3.02	3.62	3.70	*3.70*	3.70	3.76
City of Palo Alto	17.08	14.7	12.08	10.99	12.67	12.91	13.12	13.84	*13.90*
Purissima Hills Water District	1.63	1.63	2.01	1.75	1.63	1.63	1.63	1.63	1.63
City of Redwood City	10.93	10.88	11.11	9.61	11.20	11.40	11.50	11.60	*11.62*
City of San Bruno	3.25	2.65	3.11	1.46	2.65	3.25	3.25	3.25	*3.28*
City of San Jose[4,5]	0.00	4.13	4.40	4.13	4.50	6.34	6.34	6.34	6.34
City of Santa Clara[4]	0.00	4.13	4.14	2.35	4.50	4.50	4.50	4.50	4.50
Stanford University	3.03	2.91	2.32	2.14	2.70	2.90	3.10	3.30	3.50
City of Sunnyvale	12.58	10.59	8.76	9.92	8.93	8.93	8.93	8.93	8.93
Westborough County Water District	1.32	1.08	1.06	0.84	0.89	0.88	0.87	0.85	0.84
Total:	**184.0**	**184.0**	**167.4**	**149.5**	**176.1**	**182.5**	**187.7**	**191.5**	**198.0**

Notes:

1. *Projections reflect SFPUC unrestricted purchase projections provided by Wholesale Customers, regardless of ISG or ISA. Italicized values indicate interpolation or extrapolation. Wholesale Customers projections are currently being updated through individual Urban Water Management Planning processes, and therefore may change.*
2. *Individual Supply Guarantee (ISG) refers to each Wholesale Customer's share of the 184 mgd Supply Assurance as defined in section 3.01 of the 2009 Water Supply Agreement between the City and County of San Francisco and Wholesale Customers (2009 WSA). The Supply Assurance is the 184 mgd maximum annual average metered supply of water dedicated by San Francisco to public use in the wholesale service area (not including the cities of San Jose and Santa Clara). Hayward's ISG value was calculated as 184 mgd less the total of permanent customer ISG values (161.91 mgd).*
3. *ISA refers to each Wholesale Customer's share of the 265 mgd Interim Supply Limitation through 2018.*
4. *The Cities of San Jose and Santa Clara are provided water by the SFPUC on a temporary, interruptible basis. Subject to the process requirements for interruption or reduction of supply provided in Section 4.06 of the WSA, the SFPUC will continue to supply water to San Jose and Santa Clara on a temporary, interruptible basis pending a decision by the Commission, pursuant to Section 4.05H of the WSA, as to whether to make San Jose and Santa Clara permanent customers of the RWS. Per the WSA, the combined annual average water usage of San Jose and Santa Clara shall not exceed 9 mgd average annual supply.*
5. *In a letter to BAWSCA, the City of San Jose indicated a desire to purchase between 4.50 and 6.34 mgd from the SFPUC between 2020 through 2035; however, pending the 2018 decisions by the SFPUC regarding whether to (1) grant permanent status to San Jose and Santa Clara, and (2) increase the Supply Assurance, the WSA limits combined purchases to the cities to 9.0 mgd on a temporary, interruptible basis.*

For the purposes of the supply and demand comparisons provided in Section 5.7, it is assumed that, through the year 2018, each Wholesale Customer will be supplied its projected SFPUC demand up to the ISA. Following 2018, it is assumed that the SFPUC will continue to supply 184 mgd to the Wholesale Customers collectively, and that San Jose and Santa Clara will be supplied on a temporary and interruptible basis, with their total supply not to exceed 9 mgd.

Table 19 presents wholesale demands under this assumption.

Table 19: SFPUC Wholesale Customer Water Demand Projections

Demand (mgd)	2005	2010	2015	2020	2025	2030	2035
Total SFPUC Demand	167.4	149.5	174.6	182.5	178.4	182.7	184.0

Notes:

1. *Projected Wholesale Customer demands limited to ISA and ISG.*

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Section 5: Water Supply Reliability

This section addresses the reliability of both the SFPUC RWS and deliveries to the SFPUC's Retail Customers. As previously described, the Retail Customers' water supply comes from the SFPUC RWS watersheds and local water supply sources (groundwater and recycled water). Approximately 32% of the SFPUC's RWS supply is delivered to Retail Customers, and the remaining 68% is delivered to Wholesale Customers.

5.1 RWS Supply Reliability

The SFPUC's regional water supply system reliability is expressed in terms of the system's ability to deliver water during droughts. Reliability is defined by the amount and frequency of water delivery reductions (deficiencies) required to balance customer demands with available supplies in droughts. The SFPUC plans its water deliveries anticipating that a drought more severe than the worst drought ever experienced may occur. This section discusses both system-wide deficiencies and anticipated retail deficiencies that the City may experience.

The SFPUC's RWS watershed supplies have experienced infrequent, short-term outages as a result of water quality events. Because Hetch Hetchy water is not filtered, it is subject to strict water quality standards set by the California Department of Public Health. However, as a result of weather events, turbidity levels can exceed standards requiring the Hetch Hetchy supply to be diverted to local storage (in the case of short-term events) or shut off (in the case of longer-term events) until turbidity levels drop to within standards. During these periods, the SFPUC's entire supply comes from the Sunol Valley Water Treatment Plant and the Harry Tracy Water Treatment Plant, both of which are supplied by local Bay Area reservoirs.

Table 20 summarizes the legal, environmental, water quality, climatic, and other factors potentially resulting in inconsistency of supply. As described previously, the RWS may be subject to volume reductions due to required instream flow releases as well as climatic variation. Groundwater supplies are typically limited by the quality and quantity of available supplies. Institutional arrangements governing potential water transfers may affect their availability, and climatic variability may impact the availability of surface water in some years. Recycled water is limited by water quality requirements that legally restrict recycled water supply for some uses.

Table 20: Factors Potentially Affecting Consistency of Supplies

Water Supply Sources	Legal	Environmental	Water Quality	Climatic	Other (specify)
Regional Water System		✓		✓	
Groundwater			✓	✓	
Water Transfer				✓	Institutional
Recycled Water	✓		✓		

5.1.1 Estimating the Frequency and Magnitude of SFPUC RWS Supply Deficiencies

The total amount of water the SFPUC has available to deliver to Retail and Wholesale Customers during a defined period of time depends, including the amount of water that is available to SFPUC from natural runoff, the amount of water in reservoir storage, and the amount of that water that must be released from the SFPUC's system for purposes other than customer deliveries (e.g., releases below Hetch Hetchy reservoirs to meet Raker Act and instream flow release requirements, and future releases from Lower Crystal Springs and Calaveras Reservoirs to support anadromous fisheries).

The 1987-92 drought profoundly highlighted the shortfall between the SFPUC's water supplies and its demands. Other than during the drought of 1976-77, drought sequences in the past did not seriously affect the ability of the SFPUC RWS to sustain full deliveries to its Retail and Wholesale Customers. Based on the 1987-92-drought experience, the SFPUC assumes its "firm" capability to be the amount the system can be expected to deliver during historically experienced drought periods. In estimating this firm capability, the SFPUC assumes the potential recurrence of a drought such as that which occurred during 1987-92, plus an additional 2-year period of limited water availability. This drought sequence is referred to as the "design drought" and serves as the basis for planning and modeling of future drought scenarios.

5.1.2 SFPUC's Normal Year and Design Drought

For planning purposes, the SFPUC "normal year" is based on historical hydrology under conditions that allow the reservoirs to be filled over the course of the snowmelt season, allowing full deliveries to customers.

The SFPUC Design Drought, used for planning and modeling of future drought scenarios, is based on historic droughts and hydrology. As detailed below, it is a drought sequence that is more severe than what the SFPUC RWS has historically experienced.

The 1987-92 drought defines the most extreme recorded drought for SFPUC water deliveries, and establishes the basis for the Design Drought sequence. The drought covered a 6½-year period from July 1986 (when the SFPUC reservoirs were full) to about November/December 1992 (when the SFPUC reservoirs reached minimum storage). Although the SFPUC reservoir system began to recover with precipitation during the last 6 months of the drought, from July 1992 through December 1992, SFPUC customer purchases exceeded SFPUC inflow and the SFPUC system storage continued to decline through November/December 1992. Because the last 6 months of the 1987-92 drought includes the beginning of this recovery period, it has been removed from the SFPUC's Design Drought.

In summary, the design drought sequence used by the SFPUC for reliability planning totals an 8½-year period and is based on the following factors:

- **Historical Hydrology:** The 6 years of hydrology from the historical drought (July 1986 to June 1992);
- **Prospective Drought:** A 2½-year period which includes the 1976-1977 drought (to represent a drought sequence worse than historical); and
- **System Recovery Period:** The last 6 months of the Design Drought are the beginning of the system recovery period. The precipitation begins in the fall, and by approximately the month of December the SFPUC reservoir inflow exceeds customer demands and SFPUC system storage begins to recover.

For the purposes of the required UWMP 3-year drought sequence, years two through four of the SFPUC Design Drought sequence are used, representing the worst 3-year period based on historical conditions.

Table 21 summarizes the expected reductions in available water supply in normal, single dry, and multiple dry years.

Table 21: SFPUC System Water Availability During Normal and Drought Scenarios

	Average / Normal Water Year	Single Dry Water Year[2]	Multiple Dry Years[1]		
			Year 1	Year 2	Year 3
Regional Water System Watersheds	100%	90%	90%	80%	80%
Groundwater[3]	100%	100%	100%	100%	100%
Recycled Water[3]	100%	100%	100%	100%	100%

Notes:

1. *The multiple dry years shown in this table reflect years 2-4 of the SFPUC 8.5-year design drought. It is assumed that in year 1 of the design drought there are no delivery reductions and full deliveries are made.*
2. *Measured as percentage of normal year availability.*
3. *Groundwater and recycled water are San Francisco local supplies and are only available for use in the retail service area.*

At current delivery levels, the SFPUC RWS can be expected to experience up to a 25% shortage 15 to 20% of the time during multiple-year drought sequences. Therefore, the SFPUC is faced with the necessity to develop a long-term strategy to accommodate or rectify the potential of future water shortages throughout its wholesale and retail operations.

5.2 Dry Year Water Supply Options

As an established major water supplier for the Bay Area region, the SFPUC is responsible for securing and managing its existing system supplies and planning for future needs, as well as securing its own retail supply.

The WSIP water supply program includes development of dry year supplies for the RWS. The PEIR included an analysis of dry year water supply transfers from the senior water rights holders

on the Tuolumne River, MID and TID; a groundwater conjunctive use project (the Groundwater Storage and Recovery project); and a regional desalination project. The SFPUC is investigating the possibility of a dry year water transfer with MID and TID for 2 mgd, and the SFPUC is implementing the Groundwater Storage and Recovery Project.

The SFPUC's WSIP provides goals and objectives to improve the supply reliability and delivery reliability of the RWS. The goals and objectives of the WSIP related to water supply are presented in **Table 22**.

Table 22: WSIP System Performance Objectives

Program Goal	System Performance Objective
Water Supply – *meet customer water needs in non-drought and drought periods*	• Meet average annual water demand of 265 mgd from the SFPUC watersheds for Retail and Wholesale Customers during non-drought years for system demands through 2018. • Meet dry year delivery needs through 2018 while limiting rationing to a maximum 20% system-wide reduction in water service during extended droughts. • Diversify water supply options during non-drought and drought periods. • Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers.

The adopted WSIP included several water supply elements to address the WSIP water supply goals and objectives, which together will allow the SFPUC to meet at least 80% of its customer demand during droughts. The SFPUC will continue to rely on rationing up to no more than 20% in any one year of a drought.

The following describes the dry year projects of the adopted WSIP to augment all year type water supplies during drought:

- Restoration of Calaveras Reservoir capacity
- Restoration of Crystal Springs Reservoir capacity
- Groundwater Storage and Recovery Project
- Water transfer with MID/TID

5.2.1 Restoration of Calaveras Reservoir Capacity

The adopted WSIP includes the Calaveras Dam Replacement Project, which restores the reservoir capacity of Calaveras Dam from 38,100 acre-feet to 96,850 acre-feet, returning about 60,000 acre-feet of reservoir storage to the SFPUC water system. The restored capacity provides storage for emergency and drought water supplies, providing up to 7 mgd over the SFPUC design drought. In general, a restored Calaveras Reservoir provides 40% of the SFPUC's local system storage capacity. Nearly 66% of local water system yield comes

through Calaveras Reservoir from the Alameda Creek watershed. The Environmental Impact Report (EIR) was certified and the project was adopted by the SFPUC in January 2011. Construction is expected to be completed in 2015.[13]

5.2.2 Restoration of Crystal Springs Reservoir Capacity

The adopted WSIP includes the Lower Crystal Springs Dam Improvements Project, which will increase the average storage of the reservoir from 15.4 billion gallons to 17.8 billion gallons with a maximum normal operating level of 287.8 feet, providing an additional 2.4 billion gallons of storage to the SFPUC water system. The restored capacity provides storage for emergency and drought water supplies, providing up to an additional 0.5 mgd over the SFPUC design drought. The Project EIR was certified and the project was adopted by the SFPUC in October 2010. Construction is expected to be completed in 2013.[13]

5.2.3 Regional Groundwater Storage and Recovery Project

The proposed Regional Groundwater Storage and Recovery Project is an in-lieu conjunctive use project that would balance the use of both groundwater and surface water to increase water supply reliability during dry years or in emergencies. The proposed project is located in the South Westside Basin in northern San Mateo County and is sponsored by the SFPUC in coordination with its partner agencies, the California Water Service Company, the City of Daly City and the City of San Bruno. The partner agencies currently purchase wholesale surface water from the SFPUC and also independently operate groundwater production wells for drinking water and irrigation.

The proposed Regional Groundwater Storage and Recovery Project would extract stored groundwater from the South Westside Basin groundwater aquifer in San Mateo County for delivery to the RWS and the partner agencies. During years of normal or heavy precipitation, the proposed project would provide surface water to the partner agencies to reduce the amount of groundwater pumped (sometimes called "in lieu recharge"). Over time, the reduced pumping would result in the storage of approximately 61,000 acre-feet of water (more than the supply contained in the Crystal Springs Reservoir on the SFPUC Peninsula Watershed). The project would consist of installing up to 16 new wells to pump the stored groundwater during a drought. The new wells would allow recovery of the stored water at a rate of up to 7.2 mgd for a 7.5-year dry period. The water would be in compliance with the California DPH requirements for drinking water supplies. The proposed project would include construction of well pump stations, disinfection units, and piping. The proposed project is currently undergoing environmental review. EIR certification is expected in September 2012, and construction is expected to begin in May 2013.[13]

[13] This UWMP reflects that this supply will be available during the 2015-2020 time increment because information in this document is presented in 5-year increments and this supply will be available during the majority of this time period. The SFPUC believes there will be sufficient supply for the three-year drought period analyzed in this document.

5.2.4 Water Transfer with Modesto Irrigation District/Turlock Irrigation District

The adopted WSIP includes a water transfer between the SFPUC and its partners on the Tuolumne River. Certification of the WSIP PEIR, in October 2008, has allowed the SFPUC to move forward in securing a dry year water transfer in the Tuolumne River basin from the senior water rights holders: MID and TID. The water transfer would yield an average of 2 mgd over the design drought.

5.2.5 Summary of Dry Year Supplies

The dry year water supplies described above will allow the SFPUC to meet at least 80% of its customer demand during droughts. The SFPUC will continue to rely on rationing up to no more than 20% in any one year of a drought. This UWMP assumes that these resources will be available to the RWS in the volumes and timeframes indicated in **Table 23**.

Table 23: Dry Year Water Supply Reliability Water Supply Options (2010 to 2035)

	Supply Available(mgd)					
Supply Option[1]	2010	2015	2020	2025	2030	2035
Crystal Springs Reservoir Storage Recovered to 20.28 bg[2]	0	0.5	0.5	0.5	0.5	0.5
Regional Groundwater Storage and Recovery (mgd)	0	7.2	7.2	7.2	7.2	7.2
Calaveras Reservoir Storage Recovered to 31.5 bg	0	7	7	7	7	7
Water Transfers (mgd)	0	2.0	2.0	2.0	2.0	2.0

Notes:

1. *Water supply option schedule information from SFPUC WSIP, as adopted by the SFPUC on 11/29/05.*
2. *bg = Billion gallons*

Continued progress on the dry year supply projects is an important component of the SFPUC's dry year water supply program. As discussed previously, in adopting the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements project, the SFPUC agreed to provide instream flow releases below Calaveras Dam and Lower Crystal Springs Dam, as well as bypass flows below Alameda Creek Diversion Dam, to obtain required federal and state resource agency permits for construction of these projects. The instream flow release requirements for Alameda Creek and San Mateo Creek represent a potential decrease in available annual average water supply of 3.9 mgd and 3.5 mgd, respectively, for a total shortfall of 7.4 mgd on an average annual basis.[14] These instream flow releases could potentially create a shortfall in meeting the SFPUC demands of 265 mgd and slightly increase the SFPUC's dry year water supply needs. The effects of such a shortfall, if any, would occur upon the completion of

[14] This water supply decrease assumes the adopted WSIP program element of an average annual target delivery of 265 mgd. The analysis also assumes that all of the water supply components of the adopted WSIP are implemented and all WSIP projects are implemented, including the Upper Alameda Creek Filter Gallery project, which in accordance with the Program Environmental Impact Report (PEIR) assumptions is estimated to recapture up to 6300 acre-feet (AF) per year (5.6 mgd).

construction of both the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements project in approximately 2015 and 2013, respectively, at the time when the SFPUC will be required to provide the instream flow releases.

The SFPUC is currently exploring other future supplies to offset the 7.4 mgd in instream flow release requirements. These projects may include:

- Development of additional conservation and recycling
- Development of additional groundwater supplies
- Additional water transfer volumes from MID and/or TID
- Increase in Tuolumne River supply
- Revising the Upper Alameda Creek Filter Gallery Project capacity
- Development of a desalination project

Section 3.3 provides additional information on the SFPUC's planned future water supply projects.

5.3 Bay Area Regional Efforts to Improve Water Supply Reliability

The following projects and efforts currently underway or completed will help the SFPUC RWS meet its water supply reliability needs. Some of these projects are reflected in the SFPUC's current strategy for meeting water supply needs. As the remainder of these projects move through the planning stages they will continue to inform the SFPUC water supply strategy.

5.3.1 Desalination

The SFPUC's investigations of desalination as a water supply source have focused primarily on the potential for regional facilities. The proposed Bay Area Regional Desalination Project is a joint venture between the SFPUC, CCWD, EBMUD, SCVWD, and Zone 7 Water Agency.

The regional desalination project would provide an additional source of water during emergencies, provide a supplemental water supply source during extended droughts, allow other major water facilities to be taken out of service for maintenance or repairs, and increase supply reliability by providing water supply from a regional facility. The Bay Area Regional Desalination Project will produce 10 to 50 mgd.

5.3.2 Regional Interties

Regional interties help increase the reliability of the SFPUC RWS by allowing for water exchanges during emergencies, water shortages or maintenance.

- **EBMUD-Hayward SFPUC Intertie:** In 2002, the SFPUC formed a partnership with EBMUD and the City of Hayward to construct Skywest Pump Station and 1.5 miles of pipeline to link their systems. These facilities are now completed and can convey up to 30 mgd among these

three agencies to boost water supply reliability when needed. EBMUD and the SFPUC own these facilities jointly, while the City of Hayward maintains and operates them in coordination with EBMUD and the SFPUC.

- **Milpitas Intertie:** The SFPUC and SCVWD constructed a 40 mgd intertie between their two systems to exchange water during emergencies and planned maintenance. The intertie was recently used during maintenance of one of SCVWD's water treatment plants.
- **South Bay Aqueduct Interties:** The SFPUC has in the past used one permanent and one temporary intertie to the SBA for water transfers, which if reactivated would enable the SFPUC to receive SWP water.

5.3.4 Bay Area Integrated Regional Water Management Plan

The SFPUC is an active participant in the nine-county Bay Area Integrated Regional Water Management planning process. The Integrated Regional Water Management Plan (IRWMP) was first completed in November 2006 and most recently amended in December 2010. The IRWMP covers water supply and water quality, wastewater and water recycling, storm water and flood protection, and habitat protection and ecosystem restoration objectives and efforts in the Bay Area. The IRWMP also identifies integrated and collaborative projects among Bay Area agencies. DWR has recently recommended over $800,000 in Proposition 84 grant funding for the Bay Area region to be used to update the Bay Area IRWMP.

5.4 Drought Response

This section presents the SFPUC's water shortage contingency plan and includes the following information:

- An overview of SFPUC's response to past water shortage experiences;
- A summary of the procedures for allocating reduced deliveries from the SFPUC RWS; and
- A summary of the SFPUC's retail plan for responding to water shortages.

5.4.1 Past Experience with Water Shortages

Every water system has vulnerabilities in terms of its ability to provide a safe and reliable supply of water. Water shortages can occur in a number of ways. Very localized shortages can occur due to distribution system problems and system shortages can occur due to major facility failures. Yet, beyond system facility contingencies, there exists the potential vulnerability to drought, which limits the amount of water that is available over a series of years. This latter type of contingency is not necessarily caused by physical facility limitations. Within the past 25 years, San Francisco has experienced both localized shortages due to earthquakes and system-wide shortages due to drought.

The SFPUC's past experiences with water shortages, due to drought and earthquakes, have helped

shape its current plans and policies relative to water shortage preparedness and response:

- In 1987-92 San Francisco experienced a serious drought. This 6-year drought provides an example of how various stages of action were taken in times when the operational capabilities of Hetch Hetchy and other water supplies available to the SFPUC were taxed to a point that forced drastic actions to avoid running out of water.
- Following the October 17, 1989 Loma Prieta earthquake, the SFPUC worked with the Mayor's Office of Emergency Response to reconnect service to those who were impacted by the earthquake. Most of the homes that lost water service were reconnected to the water system's lines within 72 hours.
- In April 2007, below normal precipitation and snow pack caused the SFPUC to initiate a 10% voluntary reduction in water use in the service area. The call for a voluntary reduction continued through 2009.

The 1987-92 drought illustrated the deficit between the SFPUC's water supplies and its demands. Other than the 1976-77 drought, drought sequences in the past did not seriously affect the ability of the SFPUC to maintain full deliveries to its customers. As the SFPUC progressed into the drought and reservoir storage continued to decline, it became evident that full water deliveries could not be sustained without a risk of running out of water before the drought was over. This circumstance became a reality in early 1991 when the Hetch Hetchy Reservoir became so depleted (less than 25,000 acre-feet of storage in a reservoir with over 360,000 acre-feet of capacity) that minimum instream flow releases and anticipated demands required the SFPUC to initiate programs to achieve a 45% reduction in system-wide water deliveries to balance water supplies with deliveries. Fortunately, unexpected runoff provided relief from the severity of that instance of water shortage; however, the drought was far from over. **Appendix E** provides a more detailed summary of San Francisco's 1987-92 drought experience and the actions taken at the time.

5.4.2 Water Shortage Allocation Plan

As the 1987-1992 drought progressed and reservoir storage continued to decline, it became apparent that continued full deliveries could not be sustained without the risk of running out of water before the drought ended.

To provide some level of assurance that water could be delivered continuously throughout a drought (although at reduced levels), the SFPUC adopted a drought planning sequence and associated operating procedures that trigger different levels of water delivery reduction rationing relative to the volume of water actually stored in SFPUC reservoirs. Each year, during the snowmelt period, the SFPUC evaluates the amount of total water storage expected to occur throughout the RWS. If this evaluation finds the projected total water storage to be less than an identified level sufficient to provide sustained deliveries during drought, the SFPUC may impose delivery reductions or rationing.

SFPUC's response to water shortages also included the adoption of new agreements regarding how

water would be allocated in future drought periods. In connection with the adoption of the WSA, the Wholesale Customers and San Francisco adopted the Water Shortage Allocation Plan (WSAP) which outlines procedures for allocating water from the RWS to retail and Wholesale Customers during system-wide shortages of 20% or less. For shortages in excess of 20%, the WSA provides that the SFPUC may allocate water at its discretion. Section 3.11.C of the WSA authorizes the Wholesale Customers to adopt a methodology for allocating the collective wholesale allocation among the individual Wholesale Customers (see "Tier 2 Drought Implementation Plan" discussion).

Regional Water Shortage Allocations: During a drought, it is expected that the Retail and Wholesale Customers would experience a reduction in the amount of water received from the RWS. The WSAP provides specific allocations of the available water supply between the Retail and Wholesale Customers collectively associated with varying system-wide shortages of up to 20%, as shown in **Table 24**.

Table 24: Retail / Wholesale Water Allocation during System-wide Water Shortage

Level of Systemwide Reduction in Water Use Required	SFPUC Share of Available Water	Wholesale Customers Share (collectively)
5% or less	35.5%	64.5%
6% through 10%	36.0%	64.0%
11% through 15%	37.0%	63.0%
16% through 20%	37.5%	62.5%

In addition to providing an allocation method, the WSAP also includes provisions for transfers, banking and excess use charges. See Appendix G for the full text of the WSAP.

According to the WSAP allocations presented above in **Table 24**, **Table 25** and **Table 26** show SFPUC RWS Retail and Wholesale supply schedules during normal, single dry year, and multiple dry year periods. For the purposes of this analysis, the SFPUC assumed a delivery goal of 265 mgd. System-wide shortages were applied to a demand of 265 mgd and the subsequent allocations between retail and wholesale collectively.

Table 25: SFPUC Retail RWS Allocations in Normal, Dry and Multiple Dry Years

	Normal Year		Single Dry Year		Multiple Dry Years[1]					
					Year 1		Year 2		Year 3	
	(mgd)	(%)	(mgd)	(%)	(mgd)	(%)	(mgd)	(%)	(mgd)	(%)
2010	81.0	100	81.0	100.0	81.0	100.0	79.5	98.1	79.5	98.1
2015	81.0	100	81.0	100.0	81.0	100.0	79.5	98.1	79.5	98.1
2020	81.0	100	81.0	100.0	81.0	100.0	79.5	98.1	79.5	98.1
2025	81.0	100	81.0	100.0	81.0	100.0	79.5	98.1	79.5	98.1
2030	81.0	100	81.0	100.0	81.0	100.0	79.5	98.1	79.5	98.1
2035	81.0	100	81.0	100.0	81.0	100.0	79.5	98.1	79.5	98.1

Notes:

1. *Under the WSAP, the SFUPC retail allocations at a 10% shortage are 85.86 mgd. However, due to the Phased WSIP Variant, only 81 mgd of RWS supply is shown.*

Table 26: SFPUC Wholesale RWS Allocations in Normal, Dry and Multiple Dry Years

	Normal Year		Single Dry Year		Multiple Dry Years[1]					
					Year 1		Year 2		Year 3	
	(mgd)	(%)	(mgd)	(%)	(mgd)	(%)	(mgd)	(%)	(mgd)	(%)
2010	184.0	100	152.6	83.0	152.6	83.0	132.5	72.0	132.5	72.0
2015	184.0	100	152.6	83.0	152.6	83.0	132.5	72.0	132.5	72.0
2020	184.0	100	152.6	83.0	152.6	83.0	132.5	72.0	132.5	72.0
2025	184.0	100	152.6	83.0	152.6	83.0	132.5	72.0	132.5	72.0
2030	184.0	100	152.6	83.0	152.6	83.0	132.5	72.0	132.5	72.0
2035	184.0	100	152.6	83.0	152.6	83.0	132.5	72.0	132.5	72.0

Notes:

1. *Under the WSAP, the SFUPC wholesale allocations at a 10% shortage are 64% of available supply or 152.6 mgd; at a 20% shortage, the SFPUC wholesale allocations are 62.5% of available supply or 132.5 mgd.*

Retail Water Shortage Allocation Plan: The RWSAP was adopted to formalize a three-stage program of action to be taken in San Francisco to reduce water use during a drought. In accordance with the RWSAP, prior to the initiation of any water delivery reductions in San Francisco, whether it be initial implementation of reduction delivery or increasing the severity of water shortage, the SFPUC will outline a drought response plan to address the following: the water supply situation; proposed water use reduction objectives; alternatives to water use reductions; methods to calculate water use allocations and adjustments; compliance methodology and enforcement measures; and budget considerations.

This drought response plan will be presented at a regularly scheduled SFPUC Commission meeting for public input. The meeting will be advertised in accordance with the requirements of

California Water Code Section 6066 of the Government Code, and the public will be invited to comment on the SFPUC's intent to reduce deliveries.

Depending on the level of water demand and the desired objective for water use reduction, one, two or all three stages of the RWSAP may be required. **Table 27** identifies the water shortage stages of action. Additional information is provided in **Appendix F**.

Table 27: SFPUC Retail Water Shortage Stages of Action

Stage	Actions	Trigger Pt. (% system shortage)	Target Water Use Reduction (%)
1 - Voluntary	Voluntary rationing request of customers Customers are alerted to water supply conditions Remind customers of existing water use prohibitions	10-20%	5 – 10%
	Customers are alerted to water supply conditions		
	Remind customers of existing water use prohibitions		
	Education on, and possible acceleration of, incentive programs (e.g., toilet rebates)		
2 - Mandatory	All Stage 1 actions implemented	21-50%	11 – 20%
	All customers receive an "allotment" of water based on the Inside/Outside allocation method (based on base year water usages for each account)		
	Water use above the "allocation" level will be subject to excess use charges, installation of flow restrictor devices and shut-off of water		
3 - Mandatory	Same actions as in Stage 2 with further reduced allocations	>50%	>20%

Table 28 summarizes potential prohibitions that may be enforced during a drought. Appendix E discusses various measures employed during the 1987-92 drought in an attempt to achieve a 45% reduction in Retail Customer demands (as applied to the pre-drought demand). These measures included absolute limitations on water use based on residential customer classification and a proportion of historical use within the non-residential sectors. Although not anticipated to be required in the near-term, San Francisco would employ similar procedures to accommodate system-wide water shortages in excess of 20%, if necessary.

The Retail Water Shortage Allocation plan is provided in **Appendix F**.

Table 28: Potential Prohibitions That May Be Enforced During a Drought

#	Water Shortage Contingency – Mandatory Prohibitions[1]	Stage
1	Water waste, including but not limited to, any flooding or runoff into the street or gutters, was prohibited.	2, 3
2	Hoses could not be used to clean sidewalks, driveways, patios, plazas, homes, businesses, parking lots, roofs, awnings or other hard surfaces areas.	2, 3
3	Hoses used for any purpose had to have positive shutoff valves.	2, 3
4	Restaurants served water to customers only upon request.	2, 3
5	Potable water was not to be used to clean, fill or maintain levels in decorative fountains.	2, 3
6	Use of additional water was not allowed for new landscaping or expansion of existing facilities unless low water use landscaping designs and irrigation systems were employed.	2, 3
7	Water service connections for new construction were granted only if water saving fixtures or devices were incorporated into the plumbing system.	2, 3
8	Use of potable water for consolidation of backfill, dust control or other non-essential construction purposes was prohibited.	2, 3
9	Irrigation of lawns, play fields, parks, golf courses, cemeteries, and landscaping of any type with potable water would be reduced by at least the amount specified for outside use in the adopted rationing plan.	2, 3
10	Verified water waste as determined by the Water Department would serve as prima facie evidence that the allocation assigned to the water account is excessive; therefore, the allocation was subject to review and possible reduction, including termination of service.	2, 3
11	Water used for all cooling purposes was to be recycled.	2, 3
12	The use of groundwater and/or reclaimed water for irrigation of golf courses, median strips, and similar turf areas was strongly encouraged.	2, 3
13	The use of groundwater and/or reclaimed water for street sweepers/washers was strongly encouraged.	2, 3

Notes:

*1. Prohibitions prescribed in the 1987-92 drought that **may be** enforced during a future drought.*

Wholesale Customer Water Shortage Plan (Tier 2 Drought Implementation Plan, or DRIP): Section 3.11.C of the WSA authorizes the Wholesale Customers to adopt a methodology for allocating the collective wholesale allocation among the individual Wholesale Customers. In 2000, the Wholesale Customers adopted the Interim Water Shortage Allocation Plan among Suburban Customers, which details how the SFPUC water allocated to wholesale customers collectively was to be allocated to each individual Wholesale Customer. The Tier 2 Drought Implementation Plan (DRIP), which was adopted by the Wholesale Customers, provides an update to the 2000 Interim Water Shortage Allocation Plan Among Suburban Customers. The allocation included in the DRIP is based on a formula that takes two primary factors into account: (1) each agency's Supply Assurance from SFPUC, with certain exceptions, and (2) each agency's purchases from SFPUC during the 3 years preceding adoption of the Plan. Appendix G contains a copy of the Tier 1 WSAP.

5.4.3 Mechanisms to Determine Reductions in Water Use

All SFPUC Retail and Wholesale Customers are metered. Monthly water use reports are prepared by the SFPUC's Customer Service Bureau. Based on a comparison between months the SFPUC is able to determine reductions in water use for both wholesale and Retail Customers.

5.4.4 Revenue and Expenditure Impacts During Water Shortages

If the SFPUC declares a water shortage emergency under Water Code section 350 and implements the WSAP, the SFPUC may raise water rates independently of coordination with the annual budget process to make up for lost revenue due to reduced water use (WSA Section 6.03C). The SFPUC also maintains an unappropriated fund balance that can be used to offset the effects of revenue shortfalls caused by drought.

5.5 Preparation for Catastrophic Water Supply Interruption

The SFPUC has various planning documents which, in combination, address its emergency preparedness and planned response in case of a catastrophic interruption of water supplies due to power outages, earthquakes or other disasters. Additionally, the SFPUC WSIP, previously discussed in this document, includes capital projects related to seismic reliability and overall system reliability.

5.5.1 Emergency Preparedness Plans

Following the 1989 Loma Prieta Earthquake, the SFPUC created a departmental SFPUC Emergency Operations Plan (EOP). The SFPUC EOP was originally released in 1992, and has been updated approximately every 2 years. The latest EOP update will be released in Spring 2011. The EOP addresses a broad range of potential emergency situations that may affect the SFPUC and supplements the City and County of San Francisco's EOP, which was prepared by the Department of Emergency Management and most recently updated in 2008. Specifically, the purpose of the SFPUC EOP is to describe its emergency management organization, roles and responsibilities, and emergency policies and procedures.

In addition, SFPUC divisions and bureaus have their own EOPs (in alignment with the SFPUC EOP), which detail that entity's specific emergency management organization, roles and responsibilities, and emergency policies and procedures. The SFPUC tests its EOPs on a regular basis by conducting emergency exercises. Through these exercises, the SFPUC learns how well the plans and procedures will or will not work in response to an emergency. EOP improvements are based on the results of these exercises and real-world event response and evaluation. The SFPUC also has an emergency response training plan that is based on federal, State and local standards and exercise and incident improvement plans. SFPUC employees have emergency training requirements that are based on their emergency response roles.

5.5.2 Emergency Drinking Water Planning

In February 2005, the SFPUC Water Quality Bureau published the *City Emergency Drinking Water Alternatives* report. The purpose of this project was to develop a plan for supplying emergency drinking water in the City after damage and/or contamination of the SFPUC raw and/or treated water systems resulting from a major disaster. Since the publication of this report, the SFPUC has implemented a number of projects to increase its capability to support the provision of emergency drinking water during an emergency. These projects include:

- Completion of many WSIP projects and other capital upgrades to improve security, detection, and communication
- Public Information and materials for home and business
- Designation and identification of 67 emergency drinking water hydrants throughout San Francisco
- Purchase of emergency-related equipment, including water bladders and water bagging machines, to help with distribution post-disaster
- Coordination of planning with City departments, neighboring jurisdictions and other public and private partners to maximize resources and supplies for emergency response

With respect to emergency response for the SFPUC RWS, the SFPUC has prepared the SFPUC Regional Water System Emergency Response and Recovery Plan (ERRP), completed in 2003 and updated in 2006. The purpose of the ERRP is to describe the SFPUC RWS emergency management organizations, roles and responsibilities within those organizations, and emergency management procedures. This contingency plan addresses how to respond to and to recover from a major RWS seismic event, or other major disaster. The ERRP complements the other SFPUC emergency operations plans at the department, division and bureau levels for major system emergencies.

The SFPUC has also prepared in the *SFPUC Regional Water System Notification and Communications Plan*. This plan, which has been updated several times since it was first prepared in 1996 (most recently in July of 2010), provides contact information, procedures and guidelines to be implemented by the following entities when a potential or actual water quality problem arises: the SFPUC Water Supply and Treatment Division, Water Quality Division, SFPUC wholesale customers, BAWSCA, and City Distribution Division (considered to be a customer for the purposes of this plan). The plan treats water quality issues as potential or actual supply problems, which fall under the emergency response structure of the ERRP.

5.5.3 Power Outage Preparedness and Response

The SFPUC's water transmission system is primarily gravity fed, from the Hetch Hetchy Reservoir to the City. Within San Francisco's in-City distribution system, the key pump stations have generators in place and all others have connections in place that would allow portable generators to be used.

Although water conveyance throughout the RWS would not be greatly impacted by power outages because it is gravity fed, the SFPUC has prepared for potential regional power outages as follows:

- The Tesla Treatment Facility, the Sunol Valley Water Treatment Plant, and the San Antonio Pump Station, have back-up power in place in the form of generators or diesel powered pumps.
- Both the Harry Tracy Water Treatment Plant and the Baden Pump Station have back-up generators in place.
- Administrative facilities that will act as emergency operation centers also have back-up power.
- Additionally, as described in the next section, the WSIP includes projects which will expand the SFPUC's ability to remain in operation during power outages, seismic and other emergency situations.

5.5.4 Capital Projects for Seismic Reliability and Overall System Reliability

As discussed previously, the SFPUC is also undertaking a WSIP to enhance the ability of the SFPUC water system to meet identified service goals for water quality, seismic reliability, delivery reliability, and water supply.

As illustrated previously, the WSIP projects include several projects located in San Francisco to improve the seismic reliability of the in-City distribution system, as well as many projects related to the SFPUC RWS to address both seismic reliability and overall system reliability. All WSIP projects are expected to be completed by 2016.

In addition to the improvements that will come from the WSIP, San Francisco has already constructed the following system interties for use during catastrophic emergencies, short-term facility maintenance and upgrade activities, and in times of water shortages:

- A 40 mgd system intertie between the SFPUC and SCVWD (Milpitas Intertie);
- A 35 mgd intertie with EBMUD allowing EBMUD to serve the City of Hayward's demand and/or supply the SFPUC directly (and vice versa); and,
- One permanent and one temporary intertie to the South Bay Aqueduct, which would enable the SFPUC to receive State Water Project water.

The WSIP intertie projects include the EBMUD-Hayward-SFPUC Intertie. The WSIP also includes projects related to standby power facilities at various locations. These projects will provide for standby electrical power at 6 critical facilities to allow these facilities to remain in operation during power outages and other emergency situations. Permanent engine generators will be provided at 4 locations (San Pedro Valve Lot, Millbrae Facility, Alameda West, and Harry Tracy Water Treatment Plant), while hookups for portable engine generators will be provided at 2 locations (San Antonio Reservoir and Calaveras Reservoir).

5.6 Supply & Demand Comparison of the Retail Water System

This section provides an assessment of the reliability of the SFPUC retail water supply during normal, dry and multiple dry years.

The Tier 1 allocation in the WSAP translates to 81 mgd of available retail water supplies from the RWS in year 2 of a drought and 79.5 mgd of retail water supplies from the RWS in years 3 and 4 of a multi-year drought.

The following tables for supply and demand comparison assume that the recycled water and groundwater projects in San Francisco are adopted and constructed. Currently, the Planning Department is undertaking environmental review for the Westside Recycled Water project and the San Francisco Groundwater Project. The SFPUC is undertaking feasibility studies for recycled water projects on the Eastside of San Francisco and anticipates that those projects have the potential to develop an additional 2 mgd of water supply. The tables below assume these projects come on line prior to 2020; however, the SFPUC might need to rely on the full 81 mgd supply from the SFPUC watersheds. In addition, ABAG and the Metropolitan Transportation Authority are required under SB375 to allocate additional growth in the nine county Bay Area in a manner that limits GHG emissions. ABAG has recently released its draft Vision Scenario to meet these objectives. The Vision Scenario places additional housing units and jobs in San Francisco through 2035 beyond what the SFPUC included in its demand projection analysis. The Vision Scenario currently reflects 19,000 more housing units and 16,000 more jobs than were included in the demand projections. If the growth in the Vision Scenario is promoted, it could result in increased retail demands on the RWS.

Normal Years: Table 29 compares current and projected supply and demand of the SFPUC retail system. It indicates that during normal precipitation years, the SFPUC has adequate supplies to meet its projected retail water demands.

Table 29: Projected Normal Year Retail System Water Supply and Demand Comparison[1]

Supply / Demand	2010	2015	2020	2025	2030	2035
Demands (mgd)						
Retail System Demand	78	81	79	79	79	81
Supplies (mgd)						
Groundwater	2	5	5	5	5	5
Recycled Water	0	2	4	4	4	4
SFPUC RWS Watersheds	76	74	70	70	70	72
Supply and Demand Comparison						
Demand Totals (mgd)	78	81	79	79	79	81
Supply Totals (mgd)	78	81	79	79	79	81
Difference (mgd)	**0**	**0**	**0**	**0**	**0**	**0**
Difference as Percent of Demand	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
Difference as Percent of Supply	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**

Notes:

1. *Assumes groundwater and recycled water are used before RWS watershed supplies to meet retail demand. However, if these supplies are not available, additional RWS watershed supply could be used up to 81 mgd.*

Single Dry Year: **Table 30** illustrates the level of single dry year water delivery shortage that could occur with the projected 5-year increments of water demands. As shown in this table, the SFPUC is projected to have sufficient supply to meet demands in a single dry year in all scenarios.

Table 30: Projected Single Dry Year Retail System Supply and Demand Comparison[1]

Supply / Demand	2010 (mgd)	2015 (mgd)	2020 (mgd)	2025 (mgd)	2030 (mgd)	2035 (mgd)
Demands (mgd)						
Retail System Demand	78	81	79	79	79	81
Supplies (mgd)						
Groundwater	2.2	5.0	5.0	5.0	5.0	5.0
Recycled Water	0.0	2.0	4.0	4.0	4.0	4.0
SFPUC RWS Watershed	76	74	70	70	70	72
Supply and Demand Comparison						
Demand Totals (mgd)	78	81	79	79	79	81
Supply Totals (mgd)	78	81	79	79	79	81
Difference (mgd)	**0**	**0**	**0**	**0**	**0**	**0**
Difference as% of Demand	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
Difference as% of Supply	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**

Notes:

1. *Assumes groundwater and recycled water are used before RWS watershed supplies to meet retail demand. However, if these supplies are not available, additional RWS watershed supply could be used up to 81 mgd.*

Multiple Dry Years: **Table 31** illustrates the level of water delivery shortages that would be anticipated if a three-year dry hydrologic condition occurred, for each year of the 5-year intervals shown. It attempts to illustrate a theoretical application of how the different water supplies may be used in multiple dry years per the UWMP requirements. As described previously, in the event of a multi-year drought, no cutbacks are anticipated in year 1. Therefore, the dry year sequences shown below begin in year 2 of a multi-year drought.

Table 31: Projected Multiple Dry Year Retail System Supply and Demand Comparison[1,2]

Year[1]	SFPUC Supply and Demand[2,3]	Multiple Dry Year Event (mgd)		
		Year 1	Year 2	Year 3
2010	Total Retail Demand	78	78	78
	Groundwater	2	2	2
	Recycled Water	0	0	0
	RWS Watersheds[3]	76	76	76
	Total Retail Supply	78	78	78
	Difference	**0**	**0**	**0**
	Difference as% of Demand	**0%**	**0%**	**0%**
	Difference as% of Supply	**0%**	**0%**	**0%**
2015	Total Retail Demand	81	81	81
	Groundwater	5	5	5
	Recycled Water	2	2	2
	RWS Watersheds[3]	74	74	74
	Total Retail Supply	81	81	81
	Difference	**0**	**0**	**0**
	Difference as% of Demand	**0%**	**0%**	**0%**
	Difference as% of Supply	**0%**	**0%**	**0%**
2020	Total Retail Demand	79	79	79
	Groundwater	5	5	5
	Recycled Water	4	4	4
	RWS Watersheds[3]	70	70	70
	Total Retail Supply	79	79	79
	Difference	**0**	**0**	**0**
	Difference as% of Demand	**0%**	**0%**	**0%**
	Difference as% of Supply	**0%**	**0%**	**0%**
2025	Total Retail Demand	79	79	79
	Groundwater	5	5	5
	Recycled Water	4	4	4
	RWS Watersheds[3]	70	70	70
	Total Retail Supply	79	79	79
	Difference	**0**	**0**	**0**
	Difference as% of Demand	**0%**	**0%**	**0%**
	Difference as% of Supply	**0%**	**0%**	**0%**

Year[1]	SFPUC Supply and Demand[2,3]	Multiple Dry Year Event (mgd) Year 1	Year 2	Year 3
2030	Total Retail Demand	79	79	79
	Groundwater	5	5	5
	Recycled Water	4	4	4
	RWS Watersheds[3]	70	70	70
	Total Retail Supply	79	79	79
	Difference	4	4	**0**
	Difference as% of Demand	**0%**	**0%**	**0%**
	Difference as% of Supply	**0%**	**0%**	**0%**
2035	Total Retail Demand	81	81	81
	Groundwater	5	5	5
	Recycled Water	4	4	4
	RWS Watersheds	72	72	72
	Total Retail Supply	81	81	81
	Difference	**0**	**0**	**0**
	Difference as% of Demand	**0%**	**0%**	**0%**
	Difference as% of Supply	**0%**	**0%**	**0%**

Notes:

1. *The multiple dry years shown in this table reflect years 2-4 of the SFPUC's 8.5-year design drought. It is assumed that during year 1 of the design drought there are no delivery reductions and full deliveries are made. Therefore, in a design drought that starts in 2010, rationing begins in 2011; thus the supply and demand figures are based on projections for 2011, 2012, and 2013.*
2. *Under the WSAP, the SFPUC Retail allocations at a 10% shortage are 85.86 mgd. However, due to the Phased WSIP Variant (see Section 3.1.2, only 81 mgd of RWS watershed supply is shown.*
3. *Assumes groundwater and recycled water are used before RWS watershed supplies to meet retail demand. However, if these supplies are not available, additional RWS watershed supply could be used up to 81 mgd.*

5.7 Supply & Demand Comparison of the Wholesale Water System

This section provides an assessment of the reliability of the SFPUC water supply during normal, dry and multiple dry years for the SFPUC's Wholesale Customers. The reliability analysis included in the following tables does not reflect decisions that may be made by 2018 regarding serving the Wholesale Customers additional water supplies in excess of the Supply Assurance or converting San Jose and Santa Clara to permanent customers. In either case, the SFPUC would serve more than 184 mgd to the Wholesale Customers which in combination with the Retail Customers may result in a watershed demand above 265 mgd. If the SFPUC were to take on serving more than 265 mgd within the service area, the SFPUC would need to develop the additional water supplies identified in Section 3.2 to continue meeting the water supply objectives of the adopted WSIP (see **Table 22**). The SFPUC is required by the WSA to consider meeting Wholesale Customer demands beyond the Supply Assurance and converting San Jose and Santa Clara to permanent customers. As those decisions have not yet been made, the SFPUC's reliability analysis carries the current Supply Assurance forward through 2035 and does not factor either the development of additional water supplies beyond those necessary to meet demands through 2018 or meeting demands in excess of

the Supply Assurance. Future UWMPs will include additional information and analysis related to decisions regarding post-2018 water supply and demand comparisons.

Normal Years: **Table 32** compares current and projected supply and demand of the SFPUC wholesale system. It indicates that during normal precipitation years, the SFPUC has adequate supplies to meet its projected wholesale water demands.

Table 32: Projected Normal Year Wholesale Water Supply and Demand Comparison

Supply / Demand	2010	2015	2020	2025	2030	2035
Demands (mgd)[1]						
SFPUC Wholesale Demand	149	175	178	183	184	184
Supplies						
SFPUC RWS Watershed Supplies to Wholesale Customers	149	175	178	183	184	184
Supply and Demand Comparison						
Demand Totals	149	175	178	183	184	184
Supply Totals	149	175	178	183	184	184
Difference	**0**	**0**	**0**	**0**	**0**	**0**
Difference as Percent of Supply	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
Difference as Percent of Demand	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**

Notes:

1. *Assumes that, through 2018, each Wholesale Customer will be supplied its projected SFPUC demand up to the ISA. Following 2018, it has been assumed that the SFPUC will continue to supply 184 mgd to the Wholesale Customers, collectively, and San Jose and Santa Clara will be supplied on a temporary and interruptible basis. ISA values are presented in* ***Table 18****.*

Single Dry Year: Given the additional supplies assumed to be available, **Table 33** illustrates the level of first dry year water delivery shortage that could occur with the projected 5-year increments of water demands. As shown in this table, the maximum projected shortage of 18% (calculated as% of demand) would occur in 2035.

Table 33: Projected Single Dry Year Wholesale Water Supply and Demand Comparison

Supply / Demand	2010 (mgd)	2015 (mgd)	2020 (mgd)	2025 (mgd)	2030 (mgd)	2035 (mgd)
Demands (mgd)						
SFPUC Wholesale Demands[1]	149	175	178	183	184	184
Supplies (mgd)						
SFPUC RWS Watershed Supplies to Wholesale Customers	149	153	153	153	153	153
Supply and Demand Comparison						
Demand Totals (mgd)	149	175	178	183	184	184
Supply Totals (mgd)	149	153	153	153	153	153
Difference (mgd)	**0**	**22**	**26**	**30**	**31**	**31**
Difference as % of Supply	**0%**	**14%**	**17%**	**20%**	**21%**	**21%**
Difference as % of Demand	**0%**	**13%**	**14%**	**16%**	**17%**	**17%**

Notes:

1. *Assumes that, through 2018, each Wholesale Customer will be supplied its projected SFPUC demand up to the ISA. Following 2018, it has been assumed that the SFPUC will continue to supply 184 mgd to the Wholesale Customers, collectively, and San Jose and Santa Clara will be supplied on a temporary and interruptible basis. ISA values are presented in* ***Table 18****.*

Multiple Dry Years: Multiple-year drought sequences could subject the SFPUC customers to greater levels of shortage. **Table 34** illustrates the level of water delivery shortages that would be anticipated if a 3-year dry hydrologic condition occurred, for each year of the 5-year intervals shown. It attempts to illustrate a theoretical application of how the different water supplies may be used in multiple dry years per UWMP requirements. As described previously, in the event of a multi-year drought, no cutbacks are anticipated in year 1. Therefore, the dry year sequences shown below begin on year 2 of a multi-year drought.

Table 34: Projected Multiple Dry Year Wholesale Water Supply and Demand Comparison

	SFPUC Supply and Demand (mgd)	Multiple Dry Year Event[1]		
		Year 1	Year 2	Year 3
2010	SFPUC Wholesale Demands[2]	149	149	149
	RWS Watershed Supplies to Wholesale Customers	149	133	133
	Difference	**0**	**17**	**17**
	Difference as% of Supply	**0%**	**13%**	**13%**
	Difference as% of Demand	**0%**	**11%**	**11%**
2015	SFPUC Wholesale Demands[2]	175	175	175
	RWS Watershed Supplies to Wholesale Customers	153	133	133
	Difference	**22**	**42**	**42**
	Difference as% of Supply	**14%**	**32%**	**32%**
	Difference as% of Demand	**13%**	**24%**	**24%**
2020	SFPUC Wholesale Demands[2]	178	178	178
	RWS Watershed Supplies to Wholesale Customers	153	133	133
	Difference	**26**	**46**	**46**
	Difference as% of Supply	**17%**	**35%**	**35%**
	Difference as% of Demand	**14%**	**26%**	**26%**
2025	SFPUC Wholesale Demands[2]	183	183	183
	RWS Watershed Supplies to Wholesale Customers	153	133	133
	Difference	**30**	**50**	**50**
	Difference as% of Supply	**20%**	**38%**	**38%**
	Difference as% of Demand	**16%**	**27%**	**27%**
2030	SFPUC Wholesale Demands[2]	184	184	184
	RWS Watershed Supplies to Wholesale Customers	153	133	133
	Difference	**31**	**51**	**51**
	Difference as% of Supply	**21%**	**39%**	**39%**
	Difference as% of Demand	**17%**	**28%**	**28%**
2035	SFPUC Wholesale Demands[2]	184	184	184
	RWS Watershed Supplies to Wholesale Customers	153	133	133
	Difference	**31**	**52**	**52**
	Difference as% of Supply	**21%**	**39%**	**39%**
	Difference as% of Demand	**17%**	**28%**	**28%**

Notes:

1. *The multiple dry years shown in this table reflect years 2-4 of the SFPUC's 8.5-year design drought. It is assumed that during year 1 of the design drought, there are no delivery reductions and full deliveries are made. Therefore, in a design drought that starts in 2010, rationing begins in 2011; thus the supply and demand figures are based on projections for 2011, 2012, and 2013.*
2. *Assumes that, through 2018, each wholesale customer will be supplied its projected SFPUC demand up to the ISA. Following 2018, it has been assumed that the SFPUC will continue to supply 184 mgd to the Wholesale Customers collectively, and San Jose and Santa Clara will be supplied on a temporary and interruptible basis. ISA and ISG values are presented in Table 16.*

5.8 Future Actions Affecting Water Supply and Demand

The previous supply and demand comparison is based on assumptions that reflect decisions made to date. There are a multitude of upcoming actions that affect the SFPUC's water supply and may increase SFPUC water demands. These actions include:

- **Securing an additional 7.4 mgd annual average in water supply to meet the shortfall in current watershed supplies resulting from instream flow requirements in San Mateo and Alameda Creeks.** The 7.4 mgd shortfall also assumes that the Upper Alameda Creek Filter Gallery Project is able to provide an annual average water supply of approximately 5.4 mgd. Additional supplies will be necessary to resolve this shortfall long-term.
- **Resolving the status of San Jose and Santa Clara as temporary, interruptible customers.** Converting San Jose and Santa Clara to permanent, non-interruptible customers would require the SFPUC to secure 9 mgd of additional water supply. Currently, San Jose and Santa Clara are temporary customers with an interruptible status. The SFPUC will continue to meet the two cities' demands up to 9 mgd through 2018, but may issue a conditional five-year notice of termination or reduction in supply to San Jose and Santa Clara if water use by the Wholesale Customers is projected to exceed 184 mgd before June 30, 2018. Development of additional supplies would be necessary to offer San Jose and Santa Clara permanent status.
- **Resolving the additional unmet needs of the Wholesale Customers beyond 2018.** Demand projections indicate an unmet need of 5 mgd in 2035 beyond the needs of San Jose and Santa Clara. Currently, the SFPUC is obligated to meet the Wholesale Customers' Supply Assurance of 184 mgd. The SFPUC has limited its deliveries from the watersheds to the Wholesale Customers collectively to 184 mgd through 2018. The Wholesale Customers have projected an increased need for water from the SFPUC greater than 184 mgd through 2035. Development of additional supplies would be necessary to meet Wholesale Customer demands beyond 184 mgd.
- **Incorporating the results of SB 375 in demand projections for the retail and wholesale customers.** SB 375 requires ABAG and MTC to develop a Bay Area Sustainable Communities Strategy (SCS) which 1) achieves a greenhouse gas emissions reduction target set by the California Air Resources Board by reducing vehicle travel, and 2) identifies a strategy to meet the Bay Area's entire housing need by income level within the Bay Area. The SCS is scheduled to be adopted by April 2013. Results of the SCS planning effort to-date suggest an increase of 903,000 more housing units and 1,222,000 more jobs in the nine-county Bay Area by 2035 than under ABAG Projections 2009. Of this total increase, the SCS currently proposes that San Francisco would accommodate 19,000 more housing units and 16,000 more jobs than were included in this UWMP's 2035 demand projections. Wholesale Customers in the SFPUC service are expected to absorb much of this additional growth in housing and jobs under the SCS as well. If the adopted SCS places more growth in the SFPUC service area, water demand may increase.

- **Resolving additional potential shortfalls attributed to State and Federal regulatory actions or proceedings that may affect SFPUC water supplies from the Tuolumne River and local watersheds including the following:**
    - Federal Energy Regulatory Commission (FERC) relicensing of the Don Pedro Project
        - State Water Resources Control Board (SWRCB) 401 Certification of FERC relicense
        - Endangered Species Act (ESA) Section 7 consultation for FERC relicense
    - Central Valley Total Maximum Daily Load regulations
    - Bay- Delta proceedings (SWRCB, Legislative actions)
    - ESA Habitat Conservation Plans for SFPUC local watersheds

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Section 6: Demand Management Measures

This section describes the SFPUC's water demand management measures (DMMs). The SFPUC is currently implementing various conservation measures and is meeting the 14 DMMs identified under the Urban Water Management Planning Act, which also correspond to the Best Management Practices (BMPs) developed by the California Urban Water Conservation Council (CUWCC). The SFPUC is preparing its 2008-2009 and 2009-2010 BMP Reports, and expects to be in compliance with the BMP requirements.

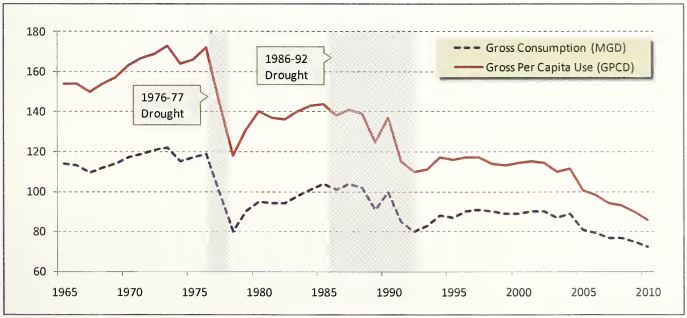
6.1 Introduction

The SFPUC has been implementing conservation programs for over 20 years. Through its continuous promotion and effort in educating San Franciscans on efficiency and appropriate use of water, its conservation efforts have helped to reduce per capita water use by over one-third since 1965.

As illustrated in **Figure 9**, the first substantial decrease occurred after the 1976-77 drought in which gross per capita water use dropped from over 160 to below 120 gpcd. Despite continuous growth in San Francisco since then, total water demand remains lower than the pre-drought levels.

A second substantial decrease in water use occurred as a result of the 1987-92 drought when a new level of conservation activities resulted in further reduction in water use. Through the continuation and expansion of these programs, per capita water use is anticipated to decrease well into the future. Today, the City's gross per capita water use is about 85.6 gpcd, one the lowest of major urban area in the state.

Figure 9: SFPUC Water Use During Historic Drought Periods



6.2 Demand Management BMPs

The conservation programs implemented by the SFPUC are based on the 14 BMPs identified by signatories of the CUWCC Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) in 1991. The BMPs describe actions and activities that encourage water conservation and are a result of balanced collaboration between urban water agencies, public interest organizations and private entities. These 14 BMPs also correspond to the 14 DMMs identified in the Urban Water Management Planning Act. The SFPUC is in process of compiling its 2008-2009 and 2009-2010 BMP reports to the CUWCC and expects to be on track to comply with BMP goals.

Under the MOU, the CUWCC was created and charged with responsibilities and authorities, including but not limited to recommending study methodologies for BMPs, collecting and summarizing information on implementation of BMPs and submitting annual reports to the State Water Resources Control Board. Signatories of the MOU are required to submit bi-annual reports to the CUWCC outlining progress toward implementing the BMPs.

The CUWCC amended the MOU in 2008, re-organizing the 14 BMPs into five categories and offering its signatories more flexible options for meeting the BMP requirements. The new BMP structure and compliance options reflect the evolutionary nature of water conservation measures as new implementation strategies are developed and new plumbing codes and technology advancements take place. **Table 35** summarizes the re-structured BMPs and the corresponding DMMs, and also lists some of the conservation measures implemented by the SFPUC that correspond to each BMP/DMM, as well as the year that each measure was implemented. A more detailed discussion of each BMP/DMM is provided in the subsequent subsections.

Table 35: SFPUC Conservation Programs and BMP/DMM Compliance

DMM[1]	BMP Categories (#)[2]	BMP/DMM Description	SFPUC Measures, Programs, or Ordinances (Implementation Year)[4]
A	P-Residential (3.1)	Residential Assistance Program: Water survey programs for SFR and MFR customers[3]	• Water Wise Evaluations (1920s*) • Water Audits for Direct Install Program (2008*) • Leak Allowance Program (1960s*) • Distribution of free devices (1990s*)
A	P-Residential (3.2)	Landscape Water Survey: Water survey programs for SFR and MFR customers	• Water Wise Evaluations (1920s*) • Water Audits for Direct Install Program (2008*)
B	P-Residential (3.1)	Residential Assistance Program: Residential Plumbing Retrofit	• Ordinance 392-90 (1990) • Ordinance 359-91, 185-91 and 346-91 (1991) • Ordinance 76-09 (2009)
C	F-Operations (1.2)	Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections	• 2-Tier water and wastewater rate structure (2009)
D	F-Operations (1.3)	Water Loss Control	• Unaccounted for Water Study (2005) • Automated Water Meter Program (2010-2012) • Pipeline Inspection Program (1990s*)
E	P-Landscape (5)	Large Landscape Conservation Programs and Incentives	• Large Landscape Audits (2008*) • Large Landscape Grant Program (2009*) • Ordinance 92-91 (1991), amended by ordinance 192-00 (2000) • Ordinance 301-10 (2010)
F	P-Residential (3.3)	High-Efficiency Clothes Washing Machine Financial Incentive Programs	• Bay Area Clothes Washer Rebate Program (2006) • PG&E Water and Energy Rebate Program (2008*)[5] • Smart Rebates Program (2008*)
G	F-Education (2.1)	Public Information Programs	• Multiple Ongoing Activities * • "Water Conservation Starts with You" Newsletter (2008) • Garden for the Environment Workshops and Tours (2008*)
H	F-Education (2.2)	School Education Programs	• Conservation Connection Program (2008*) • Garden for the Environment School Field Trips (2009*) • Water Resources Curriculum and Classroom

DMM[1]	BMP Categories (#)[2]	BMP/DMM Description	SFPUC Measures, Programs, or Ordinances (Implementation Year)[4]
			Presentations (2009*)
I	P-CII[5] (4)	Conservation Programs for CII Accounts	• Water Wise Evaluations (1989*) • Water Savers Pilot Program (2005) • Large Municipal Facilities Audits (2009*) • SFUSD[7] Green Team School Audits (2009*) • Leak Allowance Program (1960s*)
J	F-Operations (1.1.3)	Wholesale Agency Assistance Programs	• As-needed staff resource to collaborate on regional efforts through BAWSCA*
K	F-Operations (1.4)	Retail Conservation Pricing	• 2-Tier water and wastewater rate structure (2009)
L	F-Operations (1.1.1)	Conservation Coordinator	• Full-Time position(s) for Water Conservation Administrators (1986)
M	F-Operations (1.1.2)	Water Waste Prohibition	• SFPUC's Rules and Regulations for Water Service, Section E (original requirement 1960s, amendments made later) • SFPUC's Rules and Regulations for Water Service, Section F (2010, pertains to irrigation) • Ordinance 301-10 (2010)
N	P-Residential (3.4)	WaterSense Specification toilets, Residential ULFT[4] Replacement Programs	• ULFT Rebate Programs (1995-2008) • HET[8] Rebate Programs (2006*) • Direct Install Program (2009*)

Notes:

1. *The Urban Water Management Planning Act identified 14 DMMs that agencies need to evaluate in each UWMP.*
2. *F = foundational BMPs; P = programmatic BMPs. Foundational BMPs are considered to be essential water conservation activities by any utility and are adopted for implementation by all signatories to the MOU as ongoing practices with no time limits.*
3. *SFR = single-family residential; MFR = multi-family residential*
4. *ULFT = ultra-low-flush toilet*
5. *PG&E = Pacific Gas and Electric Company*
6. *CII = commercial, industrial, and institutional*
7. *SFUSD = San Francisco Unified School District*
8. *HET = high-efficiency toilet*

DMM A (BMP 3.1 & 3.2): Water Survey Programs for Residential Customers

San Francisco has provided water survey programs to its single- and multi-family residential accounts since the 1920s, focusing on the identification and repair of leaks, as well as promoting

ongoing rebate programs for water-efficient fixtures. Since approximately 1989, the SFPUC has conducted conservation audits for over 30,000 single-family and 30,000 multi-family residential customers

On average, SFPUC conducts over 600 residential water survey programs every year. Between 2007 and 2009, SFPUC conservation staff conducted 1,619 and 487 water surveys for single- and multi-family customers respectively, corresponding to an estimated water savings of over 5 acre feet[15]. In 2008, Section staff also identified and contacted the top 5% of residential water users to encourage them to take advantage of the free water surveys program to help reduce their water use.

The surveys (also referred to as water audits) are conducted by the Section's inspectors and focus on educating customers about leak detection and water-efficient practices. During each audit, an inspector monitors the site's meter, laundry area, water heater, and plumbing fixtures, as well as landscape if applicable. In larger multi-unit buildings, the inspector will then typically inspect 25-50% of the building's apartments or flats to identify additional leaks. For each site, the inspector will create a checklist for needed repairs and give a copy of the checklist to the owner or manager. A written summary is then returned to the owner or manager. At the request of the customer, the inspectors will mark the building's water shut-off valve with a plastic tag to improve its visibility in case of an emergency.

Starting in 2010, SFPUC inspectors also conducted thorough water surveys for single family homes that participate in the SFPUC's low-income Community Assistance Program (CAP). Free devices such as showerheads and faucet aerators are provided during the surveys, and customers found to have toilets eligible for replacement are scheduled for free installation of high-efficiency models (more details are available below under DMM N). To date, the SFPUC has conducted over 3,000 water surveys at CAP participant homes under this program and replaced over 2,000 toilets. The program also includes a multi-family component for which over 700 free toilets were provided to 28 buildings in 2010, and starting 2011 is expanding to include free toilets and installations to qualifying low-income multi-family buildings as part of coordination with the Mayor's Office of Housing for properties undergoing energy and water retrofits.

DMM B (BMP 3.1): Residential Plumbing Retrofit

Beginning with the adoption of *Ordinance 392-90*[16] in 1990, the City began efforts to require customers to install water-conserving devices. This ordinance changed the City's plumbing codes to require all new buildings (including any buildings in which the water drainage system is substantially altered, modified or renovated) to retrofit toilets and urinals with fixtures using no more than 1.6 gallons per flush (gpf) and 1 gpf, respectively. Ordinance 359-91[17], passed in 1991, requires the same plumbing retrofit requirements for commercial buildings, including hotels and

[15] SFPUC Water Conservation Report 2007-2010 (SFPUC, 2010). Savings were estimated for single-family water survey programs. SFPUC is currently refining its method for attributing savings to multi-family surveys.

[16] San Francisco Plumbing Code sections 905 and 1001.1

[17] San Francisco Building Code, Chapter 53B, Sections 53B01-53B15

motels.

The City then adopted a series of additional ordinances to address conservation within existing dwellings. In May and September 1991, San Francisco adopted *Ordinance 185-91* and *Ordinance 346-91*[18]. Together, these ordinances require water conservation device retrofits within single- and multi-family residential buildings upon sale, transfer of title, or major improvement to a dwelling. In 2009, an updated Residential Water Conservation Ordinance, *Ordinance 76-09,* was adopted, which requires homeowners to comply with more restrictive requirements before selling a home, including:

- Replace toilets exceeding 1.6 gpf;
- Replace showerheads with flow rate exceeding 2.5 gallons per minute (gpm);
- Replace faucets and faucet aerators having a flow rate exceeding 2.2 gpm; and
- Locate and repair all leaks.

DMM C (BMP 1.2): Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections

All of San Francisco's Retail Customers have been metered since 1916, and are billed by volume for both water and sewer use. There are approximately 178,000 existing water meters in San Francisco. A vast majority (close to 90%) of these meters are small meters (2-inch or less) used for residential and some small commercial accounts. The remaining are large meters (3-inch or greater) used for commercial, industrial or irrigation accounts.

Since 2009, the SFPUC has implemented a 2-tier water and wastewater rate structure and a 5-year rate increase[19] for its residential accounts that promotes conservation practices by sending appropriate price signals. The rate structures are summarized in **Table 36** and **Table 37**. Non-residential sewer rates vary by the type and concentration of pollutants discharged, with more polluted the sewage being assessed a greater sewer service charge per hundred cubic foot (CCF).

Table 36: Residential 2-Tier Water Rate Structure ($/CCF)

Account Type	Water Use	Effective 7/1/2009	Effective 7/1/2010	Effective 7/1/2011	Effective 7/1/2012	Effective 7/1/2013
Single Family Residential	≤ 300 CCF	$2.61	$3.09	$3.50	$3.90	$4.20
	>300 CCF	$3.48	$4.12	$4.60	$5.20	$5.50
Multi-Family Residential	≤ 300 CCF	$2.87	$3.28	$3.70	$4.20	$4.50
	>300 CCF	$3.82	$4.37	$4.90	$5.50	$5.90

[18] San Francisco Housing Code, Chapter 12A, Section 12A01-12A14

[19] The SFPUC was previously bound by Proposition H, passed in 1998, which restricted the SFPUC's ability to increase or restructure water rates. Proposition H expired in 2006.

Table 37: Residential 2-Tier Wastewater Rate Structure ($/Unit)

Account Type	Wastewater Use	Effective 7/1/2009	Effective 7/1/2010	Effective 7/1/2011	Effective 7/1/2012	Effective 7/1/2013
Single Family Residential	≤ 3 Units	$6.05	$6.91	$7.16	$7.52	$7.90
	>3 Units	$8.35	$9.21	$9.55	$10.03	$10.53
Multi-Family Residential	≤ 3 Units	$5.66	$6.51	$7.49	$7.86	$8.25
	>3 Units	$7.45	$8.68	$9.99	$10.49	$11.01

DMM D (BMP 1.3): Water Loss Control

An efficient distribution system is a key factor in ensuring efficient water use. The difference between the amount of water produced or purchased by an agency and the amount recorded as sold at customers' meters is referred to as "unaccounted for water." Some amount of loss in distribution is unavoidable due to necessary but un-metered uses such as fire fighting, main flushing, and storage facility cleaning. However, a portion of a system's losses can be controlled.

Retail Service Area: The SFPUC has an ongoing program to minimize the loss of water within its distribution system. Measures include regular investments in repair and replacement of old, leak-prone mains, systematic leak detection programs and regular meter calibration and repair programs. Since the 1970s, the SFPUC has implemented system-wide leak inspection and repair programs to reduce distribution system losses. From the use of advanced pitometer measurements and system zone analysis in the 1990s to the use of Permaloggers in 2005, the SFPUC has continuously enhanced its practices to identify leaks and reduce the unaccounted for water. In 2005, the SFPUC also completed an independent Unaccounted for Water Study to identify and quantify water losses. The study results indicate that the SFPUC leak management program is one of the most effective out of a nationwide sample. The SFPUC's system water loss is estimated to be less than 9% of total in-City demand (7% from unbilled authorized and unauthorized consumption, 2% from meter under-registration).

In Spring 2010, the SFPUC began deployment of the Automated Water Meter Program (AWMP), which will upgrade all of San Francisco's approximately 178,000 retail water meters with wireless advanced metering technology. Full deployment is anticipated by the end of 2012. The new system will measure, collect and analyze water usage more accurately and more frequently (on an hourly basis), which allows the SFPUC and customers to monitor water use and detect leaks faster and without the need for physical field visits and manual meter readings.

Wholesale Customer Service Area: The SFPUC initiated a Pipeline Inspection Program in the early 1990s on its RWS's 350 miles of water transmission lines. Routine inspections are considered preventive maintenance measures, but they also provide information on pipeline leaks. These inspections are usually conducted year-round with no more than one section of a major

pipeline out of service at any time. The Pipeline Inspection Program covers the entire water transmission system over a 20-year period and then repeats. The SFPUC has a goal to inspect one section per quarter (4 inspections per year), with each section averaging 4-6 miles. Technically, the regional system does not have any distribution system components, only transmission system components. SFPUC staff perform meter calculations that estimate the leakage rate by comparing customer usage, plant production and water crossing the San Francisco County line.

DMM E (BMP 5): Large Landscape Conservation Programs and Incentives

In 2007, the SFPUC teamed with the City Department of Recreation and Parks to conduct a study that provided detailed audits and improvement recommendations to 12 of the highest water using parks in the City.

Recognizing that irrigation of large landscapes contributes significantly to the City's water use, the SFPUC initiated a Large Landscape Grant Program in 2009. This program provides large water users the financial incentives to implement retrofits and install fixtures to maximize the use of non-potable water or to reduce irrigation water use through conservation measures and innovative practices. The program was open to all SFPUC Retail Customers with landscape size greater than or equal to 2.5 acres. The SFPUC posted notice of the grant program on its website and mailed letters to notify a number of Retail Customers with large landscapes. In response, the SFPUC received a total of eight proposals from five organizations. The proposals were evaluated based on a number of factors such as funding availability, estimated water savings, and community use and benefits. In FY 2009/10 and 2011/12, the program provided a total of over $4 million in funding for six projects. Upon completion of these projects, the SFPUC expects to achieve a water savings of over 20 million gallons per year.

To promote efficient irrigation water use and to comply with the State's Water Conservation in Landscaping Act (Assembly Bill 1881), the SFPUC replaced the existing irrigation ordinance (*Ordinance 92-91* Chapter 63 of the San Francisco Administration Code) with a new Water Efficient Irrigation Ordinance, adopted in 2010, *Ordinance 301-10*. Beginning in January 2011, new landscape projects or landscape modification projects between 1,000 and 2,500 square feet are required to increase their water-efficient plantings and limit turf plantings. Landscape projects greater than 2,500 square feet must demonstrate that their irrigation water use will stay within their assigned water budget, and must also obtain approval from the SFPUC Conservation Administrator of their landscape, irrigation, and soil management plans prior to any landscape installation. Owners of large landscaped areas greater than 10 acres must work with SFPUC staff to develop a compliance plan that lays out an implementation strategy and schedule for improving landscape water use efficiency.

DMM F (BMP 3.3): HECW Financial Incentive Programs

The SFPUC has offered a clothes washer rebate program for residential customers since 1999,

and expanded the program to commercial customers in 2004.

In 2006 and 2007, the SFPUC partnered with six water agencies to implement the Bay Area Clothes Washer Rebate Program, which offered rebates of up to $150 per residential clothes washer depending on the efficiency level. The program was co-funded by a grant from the State of California, and was featured in San Francisco's local retail appliance stores and in larger regional stores through store visits, direct mailings, and bill inserts.

Starting in 2008, the SFPUC and over 20 local water agencies have partnered with Pacific Gas and Electric Company (PG&E) to provide a combined water and energy rebate for high-efficiency clothes washing (HECW) machines. Rebate amounts for qualifying machines have ranged from $200 for the first year ($125 from the SFPUC and $75 from PG&E) to $125 as of 2011 ($75 from the SFPUC and $50 from PG&E).

To date, the SFPUC has provided almost 15,000 residential HECW rebates through both programs. Total water savings from these rebates is estimated to be more than 7,000 acre feet over the lifetime of the machines.

The SFPUC also provides HECW rebate programs to non-residential customers. In 2008, the SFPUC partnered with the CUWCC and 36 California water agencies in the Smart Rebates Program, which received grant funding from the State to provide commercial, industrial, and institutional (CII) customers with financial incentives for fixture upgrades, including HECWs. CII customers purchasing HECWs for common area laundry facilities (such as laundromats) are eligible. To date, approximately 280 commercial HECW rebates have been provided, corresponding to an estimated lifetime savings of 1,354 acre feet. The SFPUC also extended the rebate program in 2010 to business owners with leased washers.

DMM G (BMP 3.3): Public Information Programs

Retail Service Area: The SFPUC works hard to promote conservation initiatives and educate the public about efficient and appropriate use of water. Ongoing activities include:

- Newspaper advertisements;
- Direct mailings;
- Distribution of educational materials and brochures to libraries and community centers,
- Participation in community events (the SFPUC staffed more than 115 events between 2007 and 2009); and
- SFPUC websites and newsletters.

In 2008, the SFPUC also created a series of direct-mailed newsletters entitled "Water Conservation Starts with You." These newsletter series addressed the need to implement voluntary cutbacks in response to historic dry winter conditions. A total of more than 350,000 newsletters were mailed to residential and commercial accounts, informing them of dry year conditions, simple conservation practices and SFPUC conservation program incentives.

Since 2008, the SFPUC has provided funding and is working with the Garden for the Environment, a public demonstration garden in San Francisco, to offer environmental education programs to interested San Francisco residents on organic gardening, urban compost systems and sustainable food systems. The partnership includes free workshops focused on climate appropriate plant selection, efficient watering practices, and pollution prevention strategies, and compliance with local irrigation ordinance requirements.

The SFPUC has also been reaching out to customers and the public directly through its billing process. On each bill, the account's current average daily water use is shown in comparison to its water use during the same period of the previous year. The bill also provides water-saving tips for home and business owners. This information helps customers recognize their water use trends and alerts them to any significant leakage issues. Conservation-related articles and tips are also included in most of the SFPUC's bi-monthly *Currents* newsletters that are mailed to customers with their bills, e-mailed, and posted on the SFPUC's web site.

In addition, the SFPUC maintains a close relationship with high-efficiency toilet and clothes washer vendors. The SFPUC staff routinely visits plumbing and appliance retail outlets to educate vendors about the SFPUC's rebate programs. A close relationship with vendors assures that the most efficient models are available to customers and that rebate program information is accurate.

Wholesale Customer Service Area: The SFPUC provides technical and administrative assistance for public information to its Wholesale Customer agencies, as requested. In addition, the SFPUC completed a series of comprehensive water demand and conservation potential studies with its Wholesale Customers in 2004. These conservation studies evaluated the cost-effectiveness of 32 conservation measures and the resulting water savings potential for each individual Wholesale Customer. These studies provided informative and educational data for the Wholesale Customers about water conservation measures and associated water savings.

The SFPUC has also been active in many regional activities to promote water conservation in the Bay Area. Recently, the SFPUC along with BAWSCA and several other Bay Area water agencies submitted a proposal for implementation grant funding through Proposition 84 for regional water conservation activities, including public information and outreach in the Bay Area.

DMM H (BMP 2.2): School Education Programs

Retail Service Area: The SFPUC's water conservation education program enriches the knowledge of students to encourage protection and preservation of our water resources. To assist with this learning, the SFPUC offers a variety of education resources developed in partnership with the San Francisco Unified School District (SFUSD), municipal departments, community gardens and non-profit education organizations.

The SFPUC provides annual funding to the SFUSD's Conservation Connection Program for the design and implementation of a comprehensive environmental education program for underserved communities. This program provides environmentally-themed workshops for educators and field

trips for students.

The SFPUC also provides funding to the Garden for the Environment, an organic community garden, to offer field trips to San Francisco schools. Each field trip includes a pre-trip classroom visits in which students are introduced to water conservation and pollution prevention concepts that they can practice at the garden.

The SFPUC's education programs also bring water conservation to San Francisco classrooms. In 2009, the SFPUC partnered with the San Francisco Department of Environment (SFE) to develop a water resources curriculum for San Francisco's 4th and 5th grade students that covers the history of San Francisco's water supply, the water cycle, drought, alternative water resources, and the importance of water conservation. The curriculum includes fact sheets, lesson plans, and activity sheets that meet State of California curriculum standards. Each year the curriculum is marketed to a wide network of educators and the SFPUC and SFE also provide classroom presentations. In 2011, the SFPUC established a partnership with the Tuolumne River Trust to conduct annual presentations on source water and conservation to City elementary schools.

Together, the SFPUC's school education programs are expected to reach over 4,000 educators and students each year throughout San Francisco's public and private schools.

Wholesale Customer Service Area: The SFPUC is available to provide technical and administrative assistance for school education to its Wholesale Customer agencies, as requested. In several instances, the SFPUC has provided information packets on the SFPUC water system, such as the two-piece map series of the Hetch Hetchy/Peninsula Water Supply System and San Francisco's Water Distribution System to Wholesale Customers for inclusion in their school education programs.

DMM I (BMP 4): Conservation Programs for CII Accounts

Similar to the residential water survey program, San Francisco offers a commercial and industrial audit program to identify and repair leaks for its non-residential customers. Since 1989, the SFPUC has conducted conservation audits on over 15,000 CII accounts.

From 2007 to 2009, the SFPUC conducted 429 water audits in large commercial buildings, corresponding to an estimated lifetime savings of over 560 acre-feet. The audits are tailored to specific business operations and provide recommendations for increasing efficiency of processes on site, including cooling towers; meter(s); laundry facilities; restrooms; boilers; landscapes; and food service equipment such as ice machines, food steamers, and pre-rinse spray valves. The SFPUC inspector also reviews water consumption history, assesses fixture efficiencies, and informs the customers of possible financial incentives for which the property may qualify. Free water-saving devices and materials are provided as needed.

The SFPUC also launched a Water Savers Pilot Program in 2005 to pursue long-term, verifiable savings for large CII customers through incentives based on the volume of water saved. Participants included hotels, hospitals, colleges, and urban food harvesters. The potential lifetime

water savings from the 2-year pilot were estimated at 566 acre-feet.

In response to Mayor Gavin Newsom's Executive Directive in 2009 to reduce municipal water use by 10%, San Francisco's municipal departments have implemented measures and sought assistance from the SFPUC to reduce water use. Comparison of FY 2008/2009 water consumption data to 2007/2008 data reveals that City departments met the savings goal, achieving a total savings of over 700 acre-feet for the City.

In addition, the SFPUC provided technical support and conducted detailed audits on a number of large municipal facilities, including:

- City Hall
- War Memorial and Performing Arts Center (War Memorial Opera House, Louise M. Davies Symphony Hall, War Memorial Veteran's Building)
- Main Library
- San Francisco Zoo
- Police Department (10 police stations, stables, shooting range, police academy)
- Fire Department (42 fire stations, headquarters, arson unit)
- Combined Emergency Communications Center
- 25 Van Ness (Department of Public Health, Office of Housing, and others)
- 30 Van Ness (Departments of Public Health, Public Works, Parks and Recreation, etc.)
- 1650 Mission (San Francisco Planning Department, Code Enforcement Section, etc.)
- 1660 Mission (Department of Building Inspection)

The SFPUC also partnered with the SFUSD to conduct water audits at San Francisco's Green Team schools. Audits were conducted at nine schools in 2009. The program continued in 2010 with audits for additional four schools. The SFPUC inspectors were also able to perform on-site fixture retrofits such as installing 0.5 gpm aerators on lavatory faucets and 1.5 gpm aerators on classrooms and break room faucets, helping the schools realize significant instant water savings. Together, these audits represent a potential savings of over 15 acre-feet of water annually.

DMM J (BMP 1.1.3): Wholesale Agency Assistance Programs

Under the terms of the long-term WSA with its Wholesale Customers, the SFPUC cannot provide direct financial assistance for conservation programs to a Wholesale Customer and subsequently add this expense to the suburban wholesale rate base for that year. The SFPUC can provide staff to assist Wholesale Customer conservation efforts and through agreement with BAWSCA can develop service area-wide conservation programs that can be funded as a joint expense by its Retail and Wholesale Customers.

DMM K (BMP 1.4): Conservation Pricing

Retail Service Area: For many years, the SFPUC has used conservation pricing as an incentive to conserve water. To promote the installation of efficient plumbing fixtures, the SFPUC implemented an incentive rate structure for its Retail Customers.

Water and wastewater rates were last revised in 2009 with the introduction of the 2-tier rate structure and a 5-year rate increase schedule for single- and multi-family residential accounts. The rate structures are summarized previously in **Table 36** and **Table 37**. Non-residential sewer rates vary by the quantity and type of pollutants in the wastewater discharged, with more polluted wastewater assessed a greater sewer service charge per CCF.

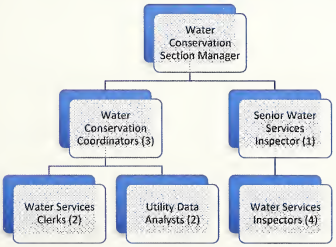
The SFPUC also addresses water use violations through its rate schedule. Violations of any water use restriction may result in the discontinuance of water service or the installation of flow restricting devices. The costs of these actions are borne by the customer.

Wholesale Customer Service Area: The SFPUC's wholesale rate structure complies with conservation pricing principles and is designed to recover the cost of providing service. Billing is based on meter readings, and utilizes an uniform rate structure. In addition, the SFPUC assesses excess use surcharges during drought periods.

DMM L (BMP 1.1.1): Water Conservation Coordinator

Retail Service Area: The SFPUC Water Conservation Section currently has 3 full-time Water Conservation Coordinators and 2 Utility Analysts. Under the direction of the Water Conservation Section Manager, these staff positions conduct implementation of various residential, landscape, and CII conservation programs. The Section also has its own inspection team and 2 water services clerks. **Figure 10** presents the current organizational chart of the SFPUC Water Conservation Section.

Figure 10: SFPUC Water Conservation Section Organization Chart (2010)



DMM M (BMP 1.1.2): Water Waste Prohibition

Section E of the SFPUC's Rules and Regulations for Water Service includes a provision regarding water waste prohibition. During the 1987-92 drought, the SFPUC enacted numerous water use restrictions and prohibitions in response to the severe water shortage. These measures are discussed in the Water Shortage Contingency Planning section of this report. With the end of the drought in 1993, the SFPUC elected to continue certain water use restrictions to further long-term conservation program. These measures are listed below and included in Section E of the SFPUC's Rules and Regulations for Water Service:

- Water waste shall be avoided, including (but not limited to) flooding or runoff into the sewers or gutters.
- Hoses used for any purpose must have positive shutoff valves.
- Restaurants shall serve water to customers only upon request.
- Decorative fountains must recycle water.
- Use of potable water for consolidation of backfill, dust control or other non-essential construction purposes is prohibited if other sources such as groundwater or reclaimed water are available and approved by the Department of Health.
- Water used for all cooling purposes and commercial car washes must be recycled.

Violation of any water use restriction may result in the installation of a flow-restricting device in the service line of the customer. Continued violation could result in termination of service. The customer bears the cost of any enforcement action.

Effective 2010, Section F of the SFPUC's Rules and Regulations for Water Service includes additional water waste prevention measures specific to irrigation, These measures are also now in the City's Water Efficient Irrigation Ordinance, *Ordinance 301-1* and include prohibition of water runoff from landscapes of all size in caused by low head drainage, overspray, broken irrigation hardware, or other conditions where water flows onto adjacent property, walks, roadways, parking lots or other structures.

DMM N (BMP 3.4): WaterSense Specification Toilets & ULFT Replacement Program

Between 2005 and 2008 the SFPUC conducted a highly visible ultralow-flush toilet (ULFT) residential rebate program providing rebates for replacement of inefficient toilets with that flush at 3.5 gpf or higher with toilets that flush at 1.6 gpf. Starting in 2006 and continuing, San Francisco has been offering rebates for replacement of 3.5 gpf or higher model toilets with High Efficient Toilets (HETs) that flush as 1.28 gpf or lower. The goal is to catalyze a market transformation toward HETs, which, unlike ULFTs, until July 2011 were not captured in the plumbing codes. Since ULFT and HET rebate program inception, San Francisco has replaced

over 30,000 inefficient toilets.

Also, under the 2009 Residential Water Conservation Ordinance, residential buildings are required to install water conservation devices upon sale, transfer of title, or major improvement. This is expected to accelerate the replacement of inefficient devices. (The Commercial Water Conservation Ordinance requires the same installation of efficient fixtures in all commercial properties by 2017).

San Francisco's water use patterns reveal that the highest household density and water consumption occur in the lower-income residential population. To assist these residential customers in overcoming the financial burden of initial fixture and installation costs, the SFPUC launched a high-efficiency toilet direct installation and water survey program in 2008. In this program, the SFPUC originally partnered with a local nonprofit organization to conduct water efficiency surveys, provide free high-efficiency devices, and identify potential households for the direct toilet install program. In 2010, the program was shifted mainly to recipients of the SFPUC's low-income CAP, which provides discounted water and wastewater to single family homes. Customers found to have toilets eligible for replacement are scheduled for free installation of high-efficiency models. Under the program, the SFPUC also delivered free HETs to more than 30 multi-family properties and starting in 2011 will be expanding free toilets and installations to low-income multi-family buildings. These toilet replacements represent a lifetime savings of over 3,000 acre-feet of water.

6.3 Beyond BMPs and DMMs

In addition to the 14 BMPs/DMMs, the SFPUC also seeks water savings through innovative programs that encourage the use of graywater and rainwater.

The SFPUC Water Enterprise teamed with the SFPUC Wastewater Enterprise in 2009 to develop a framework to promote safe use of graywater in the City. This effort included development of a guidance manual for customers on how to design simple graywater systems and launched a small laundry-to-landscape pilot program in 2011 for residential customers.

The Wastewater Enterprise also administers a rain barrel and cistern discount program and provides technical assistance related to rain barrel installation. The program also developed stormwater design guidelines and provided technical assistance on swales, rainwater gardens, stormwater planters, green roofs, and permeable pavement that captures rainwater for irrigation and recharge purposes.

Like many other water utilities, the SFPUC provides free conservation fixtures and devices to its residents during water audits and for pick up at its customer service office, such as 1.5-gpm showerheads, 0.5-gpm faucet aerators, garden spray nozzles, and toilet replacement parts (e.g. flappers and fill valves). Conservation device giveaways are a simple and cost-effective way to help customers reduce their water use. From July 2007 to June 2010, the SFPUC estimated that it distributed nearly 100,000 water-efficient devices to both residential and commercial customers.

6.4 Regional Coordination

The SFPUC seeks opportunities to work with BAWSCA and its member agencies and other water agencies, including the SCVWD, to leverage available resources on an ongoing basis. The SFPUC's commitment to regional coordination is evident in many of its conservation programs, such as the Bay Area Clothes Washer Rebate Program in 2006 and the PG&E HECW Water and Energy Rebate Program in 2008 (both programs are discussed in previous subsections).

In 2007, the SFPUC, BAWSCA, and five other Bay Area water agencies secured $1 million in grant funding for a regional "Water Saving Hero" public education campaign. This campaign provided a consistent message about water supply conditions and long-term challenges, and informed customers across the region via simple and effective water conservation examples. The integrated advertising and marketing program included regional print, transit and radio ads, marketing materials, and a new website. Throughout the campaign, the SFPUC reduced systemwide water usage by more than 13% compared to historic consumption under similar hydrologic conditions.

Section 7: Climate Change

The issue of climate change has become an important factor in water resources planning in the State, and it is being considered during planning for the RWS. There is evidence that increasing concentrations of greenhouse gases have caused and will continue to cause a rise in temperatures around the world, which will result in a wide range of changes in climate patterns. These changes will have a direct effect on water resources in California, and numerous studies on climate change have been conducted to determine the potential impacts on water resources. Based on these studies, climate change could result in the following types of water resource impacts, including impacts on the RWS and associated watersheds:

- Reductions in the average annual snowpack due to a rise in the snowline and a shallower snowpack in the low- and medium-elevation zones, such as in the Tuolumne River basin, and a shift in snowmelt runoff to earlier in the year,
- Changes in the timing, intensity, and variability of precipitation, and an increased amount of precipitation falling as rain instead of as snow,
- Long-term changes in watershed vegetation and increased incidence of wildfires that could affect water quality,
- Sea level rise and an increase in saltwater intrusion,
- Increased water temperatures with accompanying potential adverse effects on some fisheries and water quality,
- Increases in evaporation and concomitant increased irrigation need, and
- Changes in urban and agricultural water demand.

However, other than the general trends listed above, there is no clear scientific consensus on exactly how global warming will quantitatively affect the state's water supplies, and current models of State water systems generally do not reflect the potential effects of global warming.

The SFPUC performed an initial assessment of the potential effects of climate change on the RWS. This initial assessment evaluated a temperature rise of 1.5-degrees Celsius (°C) between 2000 and 2025 with no change in precipitation. The temperature rise of 1.5°C is based on a consensus among many climatologists that current global climate modeling suggests a 3°C rise may occur between 2000 and 2050. The evaluation predicts that an increase in temperature of 1.5°C will raise the snowline approximately 500 feet. The elevation of the watershed draining into Hetch Hetchy Reservoir ranges from 3,800 to 12,000 feet above mean sea level, with about 87% of the watershed area above 6,000 feet. In 2000 (a normal hydrologic year in the 82-year period of historical record), the average snowline in this watershed was approximately 6,000 feet during the winter months. Therefore, the SFPUC evaluation indicates that a rise in temperature of 1.5°C between 2000 and 2025 will result in less or no snowpack between 6,000 and 6,500 feet and faster melting of the snowpack above 6,500 feet. Statistical modeling of a 1.5°C increase indicates that

about 7% of the runoff currently draining into Hetch Hetchy Reservoir will shift from the spring/ summer seasons to the fall/winter seasons in the Hetch Hetchy basin by 2025. This percentage is within the current interannual variation in runoff and is within the range accounted for during normal runoff forecasting and existing reservoir management practices. . The predicted shift in runoff timing is similar to the results found by other researchers modeling water resource impacts in the Sierra Nevada due to warming trends associated with climate change.

The SFPUC is currently planning two additional assessment analyses. The first will utilize a newly calibrated hydrologic model of the Hetch Hetchy watershed to explore sensitivities to different climate change scenarios involving changes in air temperature and precipitation. The hydrologic model, HFAM II, simulates hydrologic processes using hourly input meteorological data to produce runoff into Hetch Hetchy Reservoir under varying conditions. Climate change parameters will be fed into the model to gauge sensitivity of runoff to those changing parameters. Because 85% of the SFPUC's supply derives from the Hetch Hetchy basin, this is an important part of understanding the potential effects of climate change on our system.

In addition, the SFPUC is project manager of a national pilot project under the auspices of the Water Utility Climate Alliance, a national coalition of drinking water providers chaired by the SFPUC general manager since its founding in 2007. The project, Piloting Utility Modeling Applications for Climate Change (PUMA) is a partnership between five water utilities, four Regional Integrated Sciences and Assessment (RISA) programs, and selected climate science experts. The project has five primary objectives:

1. Identify state-of-the-art climate modeling tools and techniques for use in assessment;
2. Articulate the uncertainties embedded in modeling results, as well as how to best use downscaled and other climate modeling data in planning;
3. Acquire climate projection data utilizing the identified modeling tools and translate that data into a form and scale that can be used by utility hydrologic models to generate watershed and/or urban runoff information;
4. Build a national collaboration with the RISA program by engaging RISA experts from the northwest, California-Nevada, southeast, and northeast regional RISA enterprises;
5. Inform developing conversations between climate science users and providers regarding how existing research meets or does not meet the needs of the adaptation community, how future investment in research might better serve society, and the nature of climate services needed on the ground in communities facing adaptation challenges.

Three utilities – the SFPUC, Seattle Public Utilities, and Tampa Bay Water – are committed to conducting pilot project assessment in conjunction with the PUMA project. Two others, Portland Water Bureau and New York City Department of Environmental Protection, are active with the project and are currently considering participating at the pilot level. Given the level of collaboration between utilities facing adaptation challenges, RISA leaders, and other climate

science experts in the PUMA project, the SFPUC expects both enhancement of the collective understanding of best practices in this arena, as well as a more detailed and robust assessment of the SFPUC's potential vulnerability to climate change, to emerge from the project. Thus, the SFPUC will be better equipped to make risk-based decisions in the future.

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Section 8: UWMP Checklist

This section provides the UWMP checklist to facilitate DWR's review of the completeness of this document. The tables are organized according to subject matter.

Contingency

#[20]	UWMP Requirement	CA Water Code	2010 UWMP Location
35	Provide an urban water shortage contingency analysis that specifies stages of action, including up to a 50-% water supply reduction, and an outline of specific water supply conditions at each stage.	10632 (a)	Table 27 (p.61)
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632 (b)	Table 31 (p.68), Table 34 (p. 72)
37	Identify actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632 (c)	Section 5.4.4 (p.63)
38	Identify additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632 (d)	Table 28 (p. 61)
39	Specify consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50% reduction in water supply.	10632 (e)	Section 5.4.2 (p. 60), Table 27 (p. 61)
40	Indicated penalties or charges for excessive use, where applicable.	10632 (f)	Table 28 (p. 61))
41	Provide an analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632 (g)	Section 5.4.4 (p. 63)
42	Provide a draft water shortage contingency resolution or ordinance.	10632 (h)	Appendix H
43	Indicate a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632 (i)	Section 4.2.4 (p.62)

[20] Numbers are according to Table I-2 of the 2010 UWMP Draft Guidebook

Demand Management Measures (DMMs)

#	UWMP Requirement	CA Water Code	2010 UWMP Location
26	Describe how each water demand management measures is being implemented or scheduled for implementation. Use the list provided.	10631(f)(1)	Table 35, Section 6.2 (pp. 77)
27	Describe the methods the supplier uses to evaluate the effectiveness of DMMs implemented or described in the UWMP.	10631(f)(3)	Section 6.3 (p. 90)
28	Provide an estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the ability to further reduce demand.	10631(f)(4)	Section 6.3 (p. 90)
29	Evaluate each water demand management measure that is not currently being implemented or scheduled for implementation. The evaluation should include economic and non-economic factors, cost-benefit analysis, available funding, and the water suppliers' legal authority to implement the work.	10631(g)	N/A All 14 DMMs are being implemented (see Section 6.2, p. 77)
30	Include the annual reports submitted to meet the Section 6.2 requirements, if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	N/A - Section completed in lieu of attaching BMP Report (currently under development)

Reliability

#	UWMP Requirement	CA Water Code	2010 UWMP Location
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage and provide data for (A) an average water year, (B) a single dry water year, and (C) multiple dry water years.	10631 (c)(1)	Section 5 (p. 50)
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631 (c)(2)	Table 20 (p. 50)
53	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. Base the assessment on the information compiled under Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)	Section 5.7 (p. 69), Section 5.5.2 (p. 64)

External Coordination and Outreach

#	UWMP Requirement	CA Water Code	2010 UWMP Location
4	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620 (d)(2)	Section 1.1 (p.2)
6	Notify, at least 60 days prior to the public hearing on the plan required by Section 10642, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Any city or county receiving the notice may be consulted and provide comments.	10621(b)	Section 1.2 (p. 3)
7	Provide supporting documentation that the UWMP or any amendments to, or changes in, have been adopted as described in Section 10640 et seq.	10621(c)	Appendix B
54	Provide supporting documentation that the urban water management plan has been or will be provided to any city or county within which it provides water, no later than 60 days after the submission of this urban water management plan.	10635(b)	Appendix G
55	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642	Appendix G
56	Provide supporting documentation that the urban water supplier made the plan available for public inspection and held a public hearing about the plan. For public agencies, the hearing notice is to be provided pursuant to Section 6066 of the Government Code. The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water. Privately-owned water suppliers shall provide an equivalent notice within its service area.	10642	Appendix G
57	Provide supporting documentation that the plan has been adopted as prepared or modified.	10642	Section 1.3 (p. 3), Appendix B
58	Provide supporting documentation as to how the water supplier plans to implement its plan.	10643	Section 1.3 (p. 3)
59	Provide supporting documentation that, in addition to submittal to DWR, the urban water supplier has submitted this UWMP to the California State Library and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. This also includes amendments or changes.	10644(a)	Section 1.3 (p. 3), Appendix B
60	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the urban water supplier has or will make the plan available for public review during normal business hours	10645	Section 1.3 (p. 3), Appendix B

Service Area

#	UWMP Requirement	CA Water Code	2010 UWMP Location
8	Describe the water supplier service area.	10631(a)	Section 2.1 (p.6)
9	Describe the climate and other demographic factors of the service area of the supplier	10631(a)	Section 2.3 (p. 14), Section 2.4 (p. 14)
10	Indicate the current population of the service area	10631(a)	Section 2.4 (p. 14), Section 2.5 (p. 17) Table 3 (p.15), Table 5 (p. 17)
11	Provide population projections for 2015, 2020, 2025, and 2030, based on data from State, regional, or local service area population projections.	10631(a)	Section 2.4 (p. 14), Section 2.5 (p. 17) Table 3 (p.15), Table 5 (p. 17)
12	Describe other demographic factors affecting the supplier's water management planning.	10631(a)	Section 14 (p. 14), Section 2.4 (p. 17)

Water Conservation

#	UWMP Requirement	CA Water Code	2010 UWMP Location
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20 (e)	Section 4.1.5 (p. 37)
-	Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions.	10608.36	Section 4.2.4 (p. 44)
3	Report progress in meeting urban water use targets using the standardized form.	10608.40	N/A. Does not apply until 2015 UWMP

Water Demands

#	UWMP Requirement	CA Water Code	2010 UWMP Location
25	Quantify past, current, and projected water use, identifying the uses among water use sectors, for the following: (A) single-family residential, (B) multifamily, (C) commercial, (D) industrial, (E) institutional and governmental, (F) landscape, (G) sales to other agencies, (H) saline water intrusion barriers, groundwater recharge, conjunctive use, and (I) agriculture.	10631 (e)(1)	Table 12 (p.35) Table 13 (p. 36) Table 18 (p. 46)
34	Include projected water use for single-family and multifamily residential housing needed for lower income households, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)	Section 4.1.4 Table 14 (p.37)

Recycled Water

#	UWMP Requirement	CA Water Code	2010 UWMP Location
44	Provide information on recycled water and its potential for use as a water source in the service area of the urban water supplier. Coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	10633	Section 3.3.2 (p. 26)
45	Describe the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)	Section 3.2.2 Table 8 (p. 25)
46	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)	Table 9 (p.25)
47	Describe the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)	Section 3.2.2 (p.24)
48	Describe and quantify the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)	Table 10 (p. 29)
49	The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	10633(e)	Table 10 (p. 29)

#	UWMP Requirement	CA Water Code	2010 UWMP Location
50	Describe the actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)	Section 3.3.3 (p. 28)
51	Provide a plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote re-circulating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)	Section 3.3.4 (p. 28)

Water Supply

#	UWMP Requirement	CA Water Code	2010 UWMP Location
5	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	10620(f)	Section 3.3 (p.26)
13	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, and 2030.	10631(b)	Section 3.1, 3.2 (pp. 18 to 23)
14	Indicate whether groundwater is an existing or planned source of water available to the supplier. If yes, then complete 15 through 21 of the UWMP Checklist. If no, then indicate "not applicable" in lines 15 through 21 under the UWMP location column.	10631(b)	Yes
15	Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631 (b)(1)	Section 3.2 (p. 23)
16	Describe the groundwater basin.	10631(b)(2)	Section 3.2 (p. 23)
17	Indicate whether the groundwater basin is adjudicated? Include a copy of the court order or decree.	10631 (b)(2)	Section 3.2 (p. 23)
18	Describe the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. If the basin is not adjudicated, indicate "not applicable" in the UWMP location column.	10631 (b)(2)	Not Applicable

#	UWMP Requirement	CA Water Code	2010 UWMP Location
19	For groundwater basins that are not adjudicated, provide information as to whether DWR has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition. If the basin is adjudicated, indicate "not applicable" in the UWMP location column.	10631 (b)(2)	Section 3.2 (p. 23)
20	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years.	10631 (b)(3)	Section 3.2 (p. 23)
21	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	10631 (b)(4)	Section 3.2 (p. 23), Section 3.3.1 (p. 26)
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)	Section 5.2.4 (p. 54)
30	Include a detailed description of all water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years, excluding demand management programs addressed in (f)(1). Include specific projects, describe water supply impacts, and provide a timeline for each project.	10631(h)	Section 5.2 (p. 52)
31	Describe desalinated water project opportunities for long-term supply, including, but not limited to, ocean water, brackish water, and GW.	10631(i)	Section 5.3.1 (p.56)
33	Provide documentation that either the retail agency provided the wholesale agency with water use projections for at least 20 years, if the UWMP agency is a retail agency, OR, if a wholesale agency, it provided its urban Retail Customers with future planned and existing water source available to it from the wholesale agency during the required water-year types.	10631(k)	Appendix G
52	Provide information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments, and the manner in which water quality affects water management strategies and supply reliability.	10634	Section 3.4 (p.30)

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Appendix A

California Urban Water Management Planning Act of 1983 (Last revised: 2009)

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CALIFORNIA WATER CODE DIVISION 6
PART 2.6. URBAN WATER MANAGEMENT PLANNING

All California Codes have been updated to include the 2010 Statutes.

CHAPTER 1.	GENERAL DECLARATION AND POLICY	10610-10610.4
CHAPTER 2.	DEFINITIONS	10611-10617
CHAPTER 3.	URBAN WATER MANAGEMENT PLANS	
Article 1.	General Provisions	10620-10621
Article 2.	Contents of Plans	10630-10634
Article 2.5.	Water Service Reliability	10635
Article 3.	Adoption and Implementation of Plans	10640-10645
CHAPTER 4.	MISCELLANEOUS PROVISIONS	10650-10656

WATER CODE
SECTION 10610-10610.4

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following:

(1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.

(2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.

(3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.

(4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.

(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.

(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.

(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.

(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.

(9) The quality of source supplies can have a significant impact

on water management strategies and supply reliability.
(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:
(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.
(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.
(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

WATER CODE SECTION 10611-10617

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city

and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

WATER CODE SECTION 10620-10621

10620. (a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d) (1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621. (a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water

supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

WATER CODE SECTION 10630-10634

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter that shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) (1) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(A) An average water year.

(B) A single dry water year.

(C) Multiple dry water years.

(2) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.

(B) Multifamily.

(C) Commercial.

(D) Industrial.

(E) Institutional and governmental.

(F) Landscape.

(G) Sales to other agencies.

(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.

(I) Agricultural.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Water survey programs for single-family residential and multifamily residential customers.

(B) Residential plumbing retrofit.

(C) System water audits, leak detection, and repair.

(D) Metering with commodity rates for all new connections and retrofit of existing connections.

(E) Large landscape conservation programs and incentives.

(F) High-efficiency washing machine rebate programs.

(G) Public information programs.

(H) School education programs.

(I) Conservation programs for commercial, industrial, and institutional accounts.

(J) Wholesale agency programs.
(K) Conservation pricing.
(L) Water conservation coordinator.
(M) Water waste prohibition.
(N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

(j) For purposes of this part, urban water suppliers that are members of the California Urban Water Conservation Council shall be deemed in compliance with the requirements of subdivisions (f) and (g) by complying with all the provisions of the "Memorandum of Understanding Regarding Urban Water Conservation in California,"

dated December 10, 2008, as it may be amended, and by submitting the annual reports required by Section 6.2 of that memorandum.

(k) Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).

10631.1. (a) The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.

(b) It is the intent of the Legislature that the identification of projected water use for single-family and multifamily residential housing for lower income households will assist a supplier in complying with the requirement under Section 65589.7 of the Government Code to grant a priority for the provision of service to housing units affordable to lower income households.

10631.5. (a) (1) Beginning January 1, 2009, the terms of, and eligibility for, a water management grant or loan made to an urban water supplier and awarded or administered by the department, state board, or California Bay-Delta Authority or its successor agency shall be conditioned on the implementation of the water demand management measures described in Section 10631, as determined by the department pursuant to subdivision (b).

(2) For the purposes of this section, water management grants and loans include funding for programs and projects for surface water or groundwater storage, recycling, desalination, water conservation, water supply reliability, and water supply augmentation. This section does not apply to water management projects funded by the federal American Recovery and Reinvestment Act of 2009 (Public Law 111-5).

(3) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if the urban water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for implementation of the water demand management measures. The supplier may request grant or loan funds to implement the water demand management measures to the extent the request is consistent with the eligibility requirements applicable to the water management funds.

(4) (A) Notwithstanding paragraph (1), the department shall

determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if an urban water supplier submits to the department for approval documentation demonstrating that a water demand management measure is not locally cost effective. If the department determines that the documentation submitted by the urban water supplier fails to demonstrate that a water demand management measure is not locally cost effective, the department shall notify the urban water supplier and the agency administering the grant or loan program within 120 days that the documentation does not satisfy the requirements for an exemption, and include in that notification a detailed statement to support the determination.

(B) For purposes of this paragraph, "not locally cost effective" means that the present value of the local benefits of implementing a water demand management measure is less than the present value of the local costs of implementing that measure.

(b) (1) The department, in consultation with the state board and the California Bay-Delta Authority or its successor agency, and after soliciting public comment regarding eligibility requirements, shall develop eligibility requirements to implement the requirement of paragraph (1) of subdivision (a). In establishing these eligibility requirements, the department shall do both of the following:

(A) Consider the conservation measures described in the Memorandum of Understanding Regarding Urban Water Conservation in California, and alternative conservation approaches that provide equal or greater water savings.

(B) Recognize the different legal, technical, fiscal, and practical roles and responsibilities of wholesale water suppliers and retail water suppliers.

(2) (A) For the purposes of this section, the department shall determine whether an urban water supplier is implementing all of the water demand management measures described in Section 10631 based on either, or a combination, of the following:

(i) Compliance on an individual basis.

(ii) Compliance on a regional basis. Regional compliance shall require participation in a regional conservation program consisting of two or more urban water suppliers that achieves the level of conservation or water efficiency savings equivalent to the amount of conservation or savings achieved if each of the participating urban water suppliers implemented the water demand management measures. The urban water supplier administering the regional program shall provide participating urban water suppliers and the department with data to demonstrate that the regional program is consistent with this clause. The department shall review the data to determine whether the urban water suppliers in the regional program are meeting the eligibility requirements.

(B) The department may require additional information for any determination pursuant to this section.

(3) The department shall not deny eligibility to an urban water supplier in compliance with the requirements of this section that is participating in a multiagency water project, or an integrated regional water management plan, developed pursuant to Section 75026 of the Public Resources Code, solely on the basis that one or more of

the agencies participating in the project or plan is not implementing all of the water demand management measures described in Section 10631.

(c) In establishing guidelines pursuant to the specific funding authorization for any water management grant or loan program subject to this section, the agency administering the grant or loan program shall include in the guidelines the eligibility requirements developed by the department pursuant to subdivision (b).

(d) Upon receipt of a water management grant or loan application by an agency administering a grant and loan program subject to this section, the agency shall request an eligibility determination from the department with respect to the requirements of this section. The department shall respond to the request within 60 days of the request.

(e) The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities. In addition, for urban water suppliers that are signatories to the Memorandum of Understanding Regarding Urban Water Conservation in California and submit biennial reports to the California Urban Water Conservation Council in accordance with the memorandum, the department may use these reports to assist in tracking the implementation of water demand management measures.

(f) This section shall remain in effect only until July 1, 2016, and as of that date is repealed, unless a later enacted statute, that is enacted before July 1, 2016, deletes or extends that date.

10631.7. The department, in consultation with the California Urban Water Conservation Council, shall convene an independent technical panel to provide information and recommendations to the department and the Legislature on new demand management measures, technologies, and approaches. The panel shall consist of no more than seven members, who shall be selected by the department to reflect a balanced representation of experts. The panel shall have at least one, but no more than two, representatives from each of the following: retail water suppliers, environmental organizations, the business community, wholesale water suppliers, and academia. The panel shall be convened by January 1, 2009, and shall report to the Legislature no later than January 1, 2010, and every five years thereafter. The department shall review the panel report and include in the final report to the Legislature the department's recommendations and comments regarding the panel process and the panel's recommendations.

10632. (a) The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier:

(1) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions that are applicable to each stage.

(2) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic

sequence for the agency's water supply.

(3) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

(4) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(5) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

(6) Penalties or charges for excessive use, where applicable.

(7) An analysis of the impacts of each of the actions and conditions described in paragraphs (1) to (6), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

(8) A draft water shortage contingency resolution or ordinance.

(9) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

(b) Commencing with the urban water management plan update due December 31, 2015, for purposes of developing the water shortage contingency analysis pursuant to subdivision (a), the urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier's

service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

WATER CODE SECTION 10635

10635. (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

WATER CODE
SECTION 10640-10645

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644. (a) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the exemplary elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has submitted its plan to the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

(c) (1) For the purpose of identifying the exemplary elements of the individual plans, the department shall identify in the report those water demand management measures adopted and implemented by specific urban water suppliers, and identified pursuant to Section

10631, that achieve water savings significantly above the levels established by the department to meet the requirements of Section 10631.5.

(2) The department shall distribute to the panel convened pursuant to Section 10631.7 the results achieved by the implementation of those water demand management measures described in paragraph (1).

(3) The department shall make available to the public the standard the department will use to identify exemplary water demand management measures.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

WATER CODE
SECTION 10650-10656

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the

"Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

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Appendix B

Evidence of Compliance with Outreach Requirements

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Summary Table of SFPUC Compliance with Public Notification Elements of the Urban Water Management Plan Act

April 27, 2011

Code Section	Code Requirement	Summary of Actions Taken	Related Attached Documentation
Water Code Section 10620	Notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes.	• March 11, 2011 letter sent to City agencies, wholesale customers of the SFPUC Regional Water System, large retail customers (e.g., SFO), large regional water agencies (e.g. EBMUD), and the Bay Area Water Supply Conservation Agency (BAWSCA). • April 27, 2011 letter regarding availability of Public Draft sent to parties listed above.	Attachment A: o Example of 3/11/11 letter o Example of 4/27/11 letter o Recipient list for cited letters
Water Code Section 10642	Encourage the active involvement of diverse social, cultural and economic elements of the population within the service area prior to and during the preparation of the plan.	• Web postings on 2010 UWMP update • Notification of Public Hearing in local community newspapers (run May 9, 2011 and May 16, 2011)	Attachment B *(to be included at a later date):* o Copies of materials posted online o Copies of ads run in local papers in Chinese and Spanish
Water Code Section 10642	Prior to the required hearing publish the notice of time and place of hearing within the jurisdiction of the supplier pursuant to Section 6066 of the Gov't Code.	• Notification of Public Hearing in local newspapers meeting requirements of Section 6066 of the Gov't Code	Attachment B *(to be included at a later date):* o Copies of ads run in SF Chronicle and SF Examiner
Water Code Section 10642	Prior to the required hearing provide notice of time and place of hearing to any city or county within which the supplier provides water.	• March 11, 2011 and April 27, 2011 letters sent to City agencies, wholesale customers of the SFPUC Regional Water System, large retail customers (SFO), large regional water agencies (e.g. EBMUD), and the Bay Area Water Supply Conservation Agency (BAWSCA).	Attachment C o Example of 3/11/11 letter o Example of 4/27/11 letter
Water Code Section 10642	Prior to adoption - make the plan available for public inspection	• Public Draft posted on www.sfwater.org • Copy hand delivered to Main Library branch.	Attachment D *(to be included at a later date):* o Transmittal letter to Public Library dated 4/27/11 o Copy of web posting of Public Draft (see Attachment B)

Code Section	Code Requirement	Summary of Actions Taken	Related Attached Documentation
Water Code Section 10642	Prior to adoption, hold a public hearing	• Public Hearing held on 5/27/11 during the meeting of the San Francisco Public Utilities Commission.	Attachment E *(to be included at a later date)*: o Copy of SFPUC Agenda of 5/27/11; Item #X is Public Hearing
Water Code Section 10642	After the hearing, the plan shall be adopted as prepared or as modified after the hearing.	• Plan adopted (as amended) on 6/14/11	Attachment F *(to be included at a later date)*: o Resolution # XX
Water Code Section 10644(a)	Within 30 days of plan adoption, submit a copy to DWR.	• Letter of transmittal to DWR of 6/21/11	Attachment G *(to be included at a later date)*: o Copy of transmittal letter to DWR (dated 6/21/11)
Water Code Section 10644(a)	Within 30 days of plan adoption, submit a copy to the CA State Library within 30 days	• Copy of adopted 2010 UWMP mailed to CA State Library on 06/21/11	Attachment G *(to be included at a later date)*: o Copy of transmittal letter to CA State Library (dated 6/21/11)
Water Code Section 10644(a)	Within 30 days of plan adoption, submit a copy to any city or county within which the supplier provides water.	• Copy of adopted 2010 UWMP mailed to all wholesale customers of the SFPUC Regional Water System on 06/21/11	Attachment H *(to be included at a later date)*: o Example of 6/21/11 letter

Note: Along with the cover letters sent on 3/11/11, 4/27/11 and 6/21/11 (to provide notice of the pending UWMP revision, availability of the Public Draft and date of public hearing, and availability of Final Draft, respectively), email notifications were also sent to a large distribution list of parties known by the SFPUC to be interested in water supply planning issues.

ATTACHMENT A

SFPUC
WATER
WASTEWATER
POWER

SAN FRANCISCO PUBLIC UTILITIES COMMISSION

1145 Market St., 4th Floor, San Francisco, CA 94103 • Tel. (415) 554-3271 • Fax (415) 554-3161 • TTY (415) 934-5770

March 10, 2011

Subject: Notice of Urban Water Management Plan 2010 Update, City and County of San Francisco and Public Hearing

The Urban Water Management Planning Act (Water Code Section 10610 – 10657) requires the City and County of San Francisco to update its Urban Water Management Plan (UWMP). We are reviewing our current UWMP, which was last updated in 2005, and will be considering revisions to it. The UWMP will include county-wide demand projections to the year 2035, compare available water supplies to meet demands and present water demand management measures to reduce long-term water demand. Additionally, the UWMP update will include a discussion of the conservation requirement set forth in Senate Bill 7 (SBx7-7) as passed in November 2009. SBx7-7 mandates a statewide 20% reduction in per capita water use by 2020. The updated UWMP will include a quantification of the SFPUC's water use reduction targets and plan for meeting these objectives. We invite your agency's participation in this process.

Proposed revisions to our UWMP will be available for public review and comment from April 27, 2011 to May 27, 2011. The Draft 2010 UWMP update will be available on the SFPUC website at www.sfwater.org (enter "UWMP" in the site Search field located in the upper right hand corner of the homepage). A copy of the document will also be available for review at the San Francisco Public Library:

San Francisco Public Library
Gov't Information Center, 5th floor
100 Larkin Street
San Francisco, CA 94102
(415) 557-4400

Notice of Public Hearing

A public hearing will be held on May 24, 2011 to allow interested members of the public to participate in the review process for the UWMP, including the SBx7-7 conservation requirement. The hearing will be held at the Commission meeting which begins at 1:30 p.m. in City Hall, Room 400, 1 Dr. Carlton B. Goodlett Place, San Francisco, California. All interested parties are invited to attend the public hearing and present their views. Persons who are unable to attend the public hearing may also submit to the City, by the time the proceedings begin, written comments regarding the subject of the hearing. These comments will be brought to the attention of the Commission and will become part of the official public record. Written comments can be sent to Mike Housh, Commission Secretary, San Francisco Public Utilities Commission, 1155 Market Street 11th Floor, San Francisco, CA 94103.

In the meantime, if you have any questions about our UWMP, or the process for updating it, please contact:

Ms. Molly Petrick
San Francisco Public Utilities Commission
1145 Market Street, 4th Floor
San Francisco, CA 94103
(415) 934-5767
MPetrick@sfwater.org

Sincerely,

Paula Kehoe

Paula Kehoe
Director of Water Resources

Recipient List: Notice of UWMP 2010 Update (sent March 11, 2011)

#	Organization2	Contact
1	California Water Service Company	Darin Duncan
2	Mid-Peninsula Water District	Paul Regan
3	Mid-Peninsula Water District	Jeanette Kalabolas
4	City of Brisbane	Jerry Flanagan
5	City of Brisbane	Randy Breault
6	City of Brisbane	Clayton Holstine
7	City of Burlingame	Syed Murtuza
8	City of Burlingame	Jim Nantell
9	City of Burlingame	George J. Bagdon
10	City of Santa Clara	Robin Saunders
11	Contra Costa Water District	Jerry Brown
12	Marin Municipal Water District	Paul Helliker
13	Coastside County Water District	David Dickson
14	City of Daly City	Patricia Martel
15	Department of Water and Wastewater Resou	Patrick Sweetland
16	Westlake Community Center	
17	Westlake Library	
18	City of East Palo Alto	Alvin D. James
19	East Palo Alto Water District	Anthony Docto
20	City of Foster City	Ray Towne
21	Estero Municipal Improvement District	Jim Hardy
22	Alameda County Water District	Walt Wadlow
23	Alameda County Water District	Paul Piraino
24	Groveland Community Service	Shane Warner
25	City of Hayward	Robert A. Bauman
26	City of Hayward	Robert Bauman
27	City of Hayward	Alex Ameri
28	Town of Hillsborough	Martha DeBry
29	Town of Hillsborough	Cyrus Kianpour
30	Town of Hillsborough	Anthony Constantouros
31	Purissima Hills Water District	Patrick Walter
32	Purissima Hills Water District	Phil Witt
33	City of Menlo Park	David Boesch
34	City of Menlo Park	Kent Steffens
35	Ctiy of Menlo Park	Ruben Nino
36	City of Millbrae	Marcia L. Raines
37	City of Millbrae	Ron Popp
38	City of Milpitas	Kathleen Phalen
39	City of Milpitas	Greg Armendariz
40	City of Milpitas	Thomas Williams
41	City of Mountain View	Kevin C. Duggan
42	City of Mountain View	Cathy Lazarus
43	City of Mountain View	Linda Forsberg
44	Calif State Coastal Conservancy	Patrycja Bossak
45	East Bay Municipal Utility District	Alexander Coate
46	North Coast County Water District	Kevin O'Connell
47	North Coast County Water District	Cari Lemke
48	City of Palo Alto	Glenn Roberts

Recipient List: Notice of UWMP 2010 Update (sent March 11, 2011)

#	Organization2	Contact
49	City of Palo Alto	Nicolas Procos
50	City of Palo Alto	Jane Ratchye
51	Castlewood Country Club	
52	Zone 7 Water Agency	Dale Myers
53	Los Trancos County Water District	Stanley R. Gage
54	City of Redwood City	Ed Everett
55	City of Redwood City	Justin Ezell
56	City of Redwood City	Peter Ingram
57	Cal. State Seismic Safety Commission	Fred Turner
58	California State Assembly, AD12	Fiona Ma
59	California Waterfowl Association	David Golden
60	City of San Bruno	Connie Jackson
61	American True / True Youth	Ward Latimer
62	Arc Ecology	Sy Allen
63	Bayview Hunters Point Cmmunity	Karen Pierce
64	Bayview Merchants Association	Al Norman
65	CA Native Plant Soc.-YB Chpt	Randy Zebell
66	California Dragon Boat Association	Brian Danforth
67	California Dragon Boat Association	Hans Wu
68	Citizens' Advisory Committee	Winchell Hayward
69	City and County of San Francisco	Joanne Hayes-White
70	City and County of San Francisco	John Rahaim
71	City and County of San Francisco	Dennis Herrera
72	City College of San Francisco	Robert Gabriner
73	Coalition for a Better Wastewater Soluti	Jeff Marmer
74	Coalition For San Francisco Neighborhood	Joan Girardot
75	Dolphin Swimming & Boating Club	Gary Ehrsam
76	Friends of Islais Creek	Robin Chiang
77	Friends of Ocean Beach	Lara Trupelli
78	Friends of Stern Grove and Pine Lake	Dylan Hayes
79	GG Heights Neighborhood Assoc	Frank Noto
80	GG Heights Neighborhood Assoc.	Dick Allen
81	GIS Services, Towill Inc.	Brian K. Young
82	Golden Gate Audubon Society	Craig Spriggs
83	Golden Gate Restaurant Association	Kevin Westlye
84	Greater West Portal Neighborhood Assoc.	Bud Wilson
85	Greater West Portal Neighborhood Associa	
86	Lake Merced Hill	Joan Cooper
87	Lake Shore Acres Improvement Club	Jim Stark
88	Lake Shore Acres Improvement Club	Flora Zagorites
89	Lakewood Tenants Association	Mona Cereghino
90	Mayor's Office of Neighborhood Services	David Gutierrez
91	MWH Americas	Sandy Lawson
92	National Park Service GGNRA	Richard Weideman
93	Neighborhood Parks Council	Meredith Thomas
94	Olympic Club and Country Club	Dennis Bouey
95	Olympic Club Rifle Team	Stephen Goth
96	Olympic Club Rifle Team	Alex Takaoka

Recipient List: Notice of UWMP 2010 Update (sent March 11, 2011)

#	Organization2	Contact
97	OMI-NIA	Eloise Banks
98	Pacific Rod & Gun Club	Ed Figone
99	Pacific Rowing Club	Eric Martinez
100	PAR	Ray Holland
101	Parkmerced	Pauletta Burroughs
102	Planning Association of the Richmond (PA	Ron Miguel
103	Plumbers Union Local 38	Larry Mazzola Jr.
104	Port of San Francisco	Monique Moyer
105	Presidio Trust	Mark Hurley
106	Public Transportation Contract Complianc	Alberta O. Grant
107	Rec & Park- West Sunset Playground	
108	Rec & Park-JP Murphy Playground	
109	Rec & Park-Sunset Rec Center	
110	San Francisco Beautiful	Marcie Keever
111	San Francisco Board of Supervisors	Carmen Chu
112	San Francisco Board of Supervisors	Malia Cohen
113	San Francisco Board of Supervisors	David Chiu
114	San Francisco Board of Supervisors	Sean Elsbernd
115	San Francisco Board of Supervisors	Ross Mirkarimi
116	San Francisco Board of Supervisors	Mark Farrell
117	San Francisco Board of Supervisors	John Avalos
118	San Francisco Board of Supervisors	David Campos
119	San Francisco Board of Supervisors	Eric Mar
120	San Francisco Board of Supervisors	Jane Kim
121	San Francisco Board of Supervisors	Scott Wiener
122	San Francisco Democratic Central Committ	Leslie Katz
123	San Francisco Department of Public Healt	Barbara Garcia
124	San Francisco Department of Public Works	Edward Reiskin
125	San Francisco International Airport	John Martin
126	San Francisco Parks Trust	Amy Jean Boebel
127	San Francisco Public Library	Luis Herrera
128	San Francisco Public Library, Merced Bra	
129	San Francisco Recreation and Park Dept.	Phil Ginsburg
130	San Francisco Redevelopment Agency	Fred Blackwell
131	San Francisco Redevelopment Agency	Gaynell Armstrong
132	San Francisco Republican Central Committ	Mike Denunzio
133	San Francisco Rifle Association	Maurice Milam
134	San Francisco Small Business Network	Pat Christensen
135	San Francisco State University	Ryszard Dziadur
136	San Francisco State University	Ryszard Dziadur
137	San Francisco State University	Barbara Holzman
138	San Francisco Tomorrow	Dennis Antenore
139	San Francisco Tomorrow	Jennifer Clary
140	Save our Richmond Environment	Owen Brady
141	SF Airport	Jon Ballesteros
142	SF Bay Guardian	Bruce Bruggmann
143	SF Chamber of Commerce	Roberta Achtenberg
144	SF Council of District Merchants	Stephen Cornell

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146	SF Republican Central Committee	Chris Bowman
147	SF SAFE	Michael Wong
148	SF State	Erik Elder
149	SF State	Erik Elder
150	SF Zoo	John Biale
151	SFPL- Ortega Branch	Pat Dimmick
152	SFPL- Parkside Branch	Jane Hudson
153	Sierra Club	Becky Evans
154	Sierra Club	Howard Strassner
155	Sierra Club	Ruth Gravanis
156	Small Business Commission	Regina Dick-Endrizzi
157	Small Merchant/Business Network	Cliff Waldeck/Syndi Seed
158	South End Rowing Club	Diane Davis
159	South End Rowing Club	Leslie Steele
160	Southeast Community Facility	Toye Moses
161	SPEAK	Marc Duffet
162	SPUR	Dick Morten
163	Sunset Beacon/Richmond Review	Carol Dimmick
164	Sunset District Neighborhood Coalition	
165	Sunset Neighborhood Beacon Center	
166	Sunset Parkside Edu. & Action Committee	Carolyn Gates
167	Sunset Residents Association	Johnson Kwong
168	Sunset Youth Services	Dawn Steukle
169	Sunshine Ordinance Task Force	David Pilpel
170	Taraval Parkside Merchants Association	Scott Hauge
171	The Villas Park Merced	Margarita Gonzalez
172	The Villas Park Merced	Mary Ann Nielsen
173	Tuolumne River Trust	Peter Drekmeier
174	Tuolumne River Trust	Jessie Raeder
175	U.S. EPA Region 9	Jacqueline Ann
176	UCSF Rowing Club	Mary Allen
177	Urban Resource Systems	Isabel Wade
178	West of Twin Peaks Central Council	Barbara Chionsini
179	West of Twin Peaks Central Council	Rae Doyle
180	West of Twin Peaks Observer	Phyllis Sherman
181	Westwood Park Association	Greg Clinton
200	California Trout	Mondy Lariz
201	California Water Service Co.	Rob Guzzetta
202	California Water Service Co.	Robert Guzzetta
203	California Water Service Company	Peter Nelson
204	City of San Jose	Mansour Nasser
205	Santa Clara Valley Water Dist.	Beau Goldie
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216	City of Santa Clara	Alan Kurotori
217	Committee to Save Lake Merced	Kristin Cadagan
218	BAWSCA	Robert Craig
219	Westborough Water District	Darryl Barrow
220	Stanford University	Mike Goff
221	Stanford University	Marty Laporte
222	City of Sunnyvale	James Craig
223	City of Sunnyvale	Marvin Rose
224	Sunol Valley Golf Club	
225	Turlock Irrigation District	Robert Nees
226	Olympic Club	Robert Maddow
227	Olympic Golf Club	Bob Maddow
228	City of East Palo Alto	M.L. Gordon
229	City of Hayward	David Fran
230	City of San Bruno	Mark Reinhardt
231	City of San Jose	Debra Figone
232	Consultant	Peter Young
233	Cordilleras Water District	Richard Thall
234	Lawrence Livermore Lab	Ellen Raber
235	Restore Hetch Hetchy	Jerry Meral
236	San Francisco Neighborhood Parks Council	Rachel Russell
237	SF Department of Building Inspections	Vivian Day
238	SF Sheriff' Office	Michael Hennessey
239	Sunset District Neighborhood Coalition	Susan Suval
240	Westborough Water District	Darryl Barrow

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Appendix C

Resolution to Adopt the 2010 Urban Water Management Plan

(will be included at a later time)

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Appendix D

SFPUC Retail Demand Model Update and Calibration Technical Memorandum

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POLICY ANALYSIS
FOR THE
PUBLIC AND PRIVATE
SECTORS
M.CUBED

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MITCHELL@MCUBED-ECON.COM

Date: April 21, 2011

From: David Mitchell

To: RMC

Technical Memorandum: SFPUC Retail Demand Model Update and Calibration

1 TM OVERVIEW

This technical memorandum (TM) describes updates made to the SFPUC Retail Demand Model, model calibration, and demand projections with and without SFPUC conservation programming. Model background and the need to update the model are described in Section 2. Updates to the structure of the model, projections of population, housing, and employment, specification of conservation programs, codes, and ordinances, and model calibration are described in Section 3. Updated projections of retail demands, conservation program water savings, conservation program expenditure, and conservation program unit costs are presented in Section 4. This TM only addresses the model update process, assumptions, and results. The Conservation Implementation Plan, which is being prepared as a separate document, will provide more detailed information on proposed conservation programs, costs, and expected water savings.

2 BACKGROUND

The SFPUC Retail Demand Model was originally developed in 2004 and used by SFPUC to forecast in-city retail water demands through 2030 with and without conservation programs. The original specification of the model and the data used to implement it are described in the 2004 report "City and County of San Francisco Retail Water Demands and Conservation Potential."[1] The model includes modules to estimate and forecast water use for single-family, multi-family, and non-residential in-city retail customer

[1] "City and County of San Francisco Retail Water Demands and Conservation Potential," prepared for San Francisco Public Utilities Commission Planning Bureau by Margaret A. Hannaford, P.E. and Hydroconsult, Inc., November 2004; "SFPUC City and County of San Francisco, Retail Water Demands and Conservation Potential Errata Sheet," prepared by Margaret A. Hannaford, August 28, 2005.

sectors. In addition the model estimates changes in retail demands due to codes and ordinances affecting water fixture efficiency and water use behavior.

SFPUC retained RMC to update the model and use it to prepare new in-city retail demand forecasts with and without conservation. The following elements of the model were the primary targets for the update:

- Population, Housing, and Employment Projections – The model uses projections of population, housing, and employment to forecast residential and non-residential retail water demands. SFPUC wished to update these projections so that they matched current forecasts from ABAG, California Department of Finance, and the City.
- Unaccounted Water Loss – The original model specification double counts water losses due to customer meter under-registration, causing the model to overestimate in-city retail demands (see Attachment 2). Unaccounted-for-Water represents unbilled authorized consumption (including metered high pressure fire fighting consumption, unmetered main flushing, street cleaning and dust control and low pressure fire hydrant use) and unbilled unauthorized consumption (including water lost to the system through all types of leaks, breaks and overflows). These losses are assumed to be approximately 6.9% of total in-city demand. Meter under-registration is also considered unbilled unauthorized consumption and is captured in the demand calculations for each billing sector. It is assumed that meter under-registration is 2.2% of residential demand and 2.1% of non-residential demand. Total loss in the City due to meter under-registration, unbilled authorized consumption and unbilled unauthorized consumption is approximately 9.0% of in-city demand.
- Codes and Ordinances – The original model needed updating to incorporate current and anticipated codes and ordinances impacting retail water demand, including the City's 2009 Retrofit on Resale (ROR) ordinance, the phase-in of high-efficiency toilet standards under AB 715, California Energy Commission's (CEC) proposed efficiency standards for residential clothes washers, and California's and the City's green building standards.
- Conservation Program Specification – The conservation program specifications in the original model were out of date and did not accurately reflect the mix of conservation programs and technologies SFPUC expects to implement over the next 10 to 20 years. Additionally, the assumptions of program water savings, implementation costs, and activity levels needed to be revised.
- Model Structure – A number of changes to the model's structure were required to make water savings and device inventory and saturation calculations more transparent.
- Forecast Period – The model was extended to forecast through 2035 in order to support SFPUC UWMP demand projections.
- Financial Assumptions – discount rate and inflation assumptions and the derivation of conservation program unit costs of saved water were updated to

conform to those currently being used by SFPUC for long-range water supply planning.

3 Model Update

3.1 File Structure

The update maintained the basic file structure of the original model. The model consists of five linked Excel workbooks, whose file names are identical to the original model, except that each file name ends with "_v2.xls" to distinguish it from the original file. The five workbook files are the following:

Master_v2.xls – This workbook is used to:

- Specify costs, savings, and production assumptions of conservation programs and code/ordinance requirements;
- Specify other common assumptions used throughout the model, such as interest and inflation rate assumptions;
- Define conservation program portfolios or "packages";
- Summarize economic measures of expected performance, including unit cost of water savings and benefit-cost ratio for both individual programs and program portfolios.

RetailConservation_v2.xls – This workbook is used to:

- Specify service area population, housing, and employment assumptions and projections;
- Generate projections of SFPUC retail water demands with and without conservation programs;
- Break down SFPUC retail water demand projections by customer class and residential end use (The model includes 4 retail demand classes – single-family, multi-family, non-residential, and other); and
- Calibrate the model.

1-RSFConsMeas_v2.xls – This workbook is used to:

- Calculate expected water savings for conservation programs, codes, and ordinances affecting single-family water demands;
- Calculate unit costs of water savings for conservation programs and ordinances affecting single-family water demands; and
- Summarize projected single-family water demands for 2005 to 2030 with and without conservation.

2-RMFConsMeas_v2.xls – This workbook is used to:

- Calculate expected water savings for conservation programs, codes, and ordinances affecting multi-family water demands;

- Calculate unit costs of water savings for conservation programs and ordinances affecting multi-family water demands; and
- Summarize projected multi-family water demands for 2005 to 2030 with and without conservation.

3-NRConsMeas_v2.xls – This workbook is used to:

- Calculate expected water savings for conservation programs, codes, and ordinances affecting non-residential water demands;
- Calculate unit costs of water savings for conservation programs and ordinances affecting non-residential water demands; and
- Summarize projected non-residential water demands for 2005 to 2030 with and without conservation.

It is best to have all five workbooks open when working with the model to ensure that all formulas and links are updated correctly when model inputs are changed.

3.2 Population, Housing, and Employment Projection Update

Population, housing, and employment projections used in the model to forecast future retail demands were updated to reflect current projections. The forecast period was extended from 2030 to 2035 in order to support SFPUC UWMP demand projections.

3.2.1 Population Projection Update

Forecasted household population for 2000, 2005, and 2010 were updated with Department of Finance E-5 Housing and Population Estimates, dated May 2010. The 2030 population estimate was taken from the Citywide Projections, dated July 2009. Household populations for 2015, 2020, and 2025 were interpolated using the 2010 and 2030 projections. The 2035 projection of population is based on the 2035 forecast of housing units assuming average persons per household are unchanged between 2030 and 2035.

The model's original and updated population projections are shown in Table 1. As shown in this table, the percent change in population projections continues to increase with time; updated 2030 projections are about 7.9 percent greater than what was used in the original model.

Table 1
SFPUC Retail Demand Model Updated Population Projection

Year	Original	Updated[1]	% Change
2000	756,976	756,976	0.0%
2005	772,470	787,033	1.9%
2010	787,965	835,021	6.0%
2015	803,459	854,755	6.4%
2020	818,954	874,956	6.8%
2025	834,448	895,633	7.3%
2030	849,942	916,800	7.9%
2035	N/A	941,263	N/A

[1]Updated population estimates for 2000 thru 2010 are from Department of Finance's E-5 Housing and Population Estimates, dated May 2010. The 2030 population estimate is from the Citywide Projections, dated July 2009. Household populations for 2015, 2020, and 2025 were interpolated using the 2010 and 2030 projections. The 2035 projection of population is based on the 2035 forecast of housing units assuming average persons per household are unchanged between 2030 and 2035.

3.2.2 Household Projection Update

The projected total number of housing units for 2000, 2005, and 2010 were updated with Department of Finance E-5 Housing and Population Estimates, dated May 2010. The 2030 housing unit estimate was taken from the Citywide Projections, dated July 2009. Housing unit projections for 2015, 2020, and 2025 were interpolated using the 2010 and 2030 projections. The 2035 projection of total housing units is taken from ABAG's Projections 2009.

Single family housing units in 2000 and 2010 were set equal to the number of single family residential accounts for those years. Single family housing units for other years were interpolated using the average rate of single family account growth from 1990 to 2010.[2] The number of multi family housing units was imputed as the difference between the projection of total housing units and single family housing units.

The model's original and updated projections for total, single, and multi family housing units are shown in Table 2, Table 3, and Table 4. As shown in Table 2, the percent change in total housing units continue to increase with time, with 2030 total housing unit projections being about 8 percent higher than the original model projections. The number of single family households projected for 2030 increased by 4 percent (see

[2] Single family accounts grew at an average annual rate of 0.24% between 1990 and 2010.

Table 3) and the number of multi-family household projected for 2030 increased by 9.7 percent (See Table 4).

Table 2
SFPUC Retail Demand Model Updated Total Housing Unit Projection

Year	Original	Updated[1]	% Change
2000	329,703	329,700	0.0%
2005	337,005	338,024	0.3%
2010	344,306	350,758	1.9%
2015	351,608	363,213	3.3%
2020	358,909	376,109	4.8%
2025	366,211	389,463	6.4%
2030	373,513	403,292	8.0%
2035	N/A	415,000	N/A

[1] Projected total number of housing units for 2000, 2005, and 2010 were updated with Department of Finance E-5 Housing and Population Estimates, dated May 2010. The 2030 housing unit estimate was taken from the Citywide Projections, dated July 2009. Housing unit projections for 2015, 2020, and 2025 were interpolated using the 2010 and 2030 projections. The 2035 projection of total housing units is taken from ABAG's Projections 2009.

Table 3
SFPUC Retail Demand Model Updated Single Family Housing Unit Projection

Year	Original	Updated[1]	% Change
2000	108,255	108,255	0.0%
2005	109,985	109,500	-0.4%
2010	111,410	110,759	-0.6%
2015	111,725	112,109	0.3%
2020	111,745	113,475	1.5%
2025	111,765	114,857	2.8%
2030	111,785	116,257	4.0%
2035	N/A	117,674	N/A

[1]Updated single family housing unit projection for 2000 and 2010 are from SFPUC single family account data. Single family housing unit projections for other years were interpolated using the average rate of single family account growth from 1990 to 2010.

Table 4
SFPUC Retail Demand Model Updated Multi Family Housing Unit Projection

Year	Original	Updated[1]	% Change
2000	221,448	221,445	0.0%
2005	227,020	228,524	0.7%
2010	232,896	239,999	3.0%
2015	239,883	251,104	4.7%
2020	247,164	262,634	6.3%
2025	254,446	274,606	7.9%
2030	261,728	287,035	9.7%
2035	N/A	297,326	N/A

[1]Updated multi family housing units were imputed as the difference between the projection of total housing units and single family housing units.

3.2.3 Persons Per Household Projection Update

Projected persons per household for single and multi family housing units were derived from Census 2000 data and then scaled so that household population computed by multiplying the number of housing units by persons per household equaled the updated population projection in Table 1. Projected persons per household were assumed to be the same in 2030 and 2035.

The model's original and updated persons per household projections for single and multi family housing units are shown in Table 5 and Table 6. As shown in Table 5, single family persons per household increased from 2.7 in the original model to about 3.1 in the updated model. As shown in Table 6, multi-family persons per household *decreased* from 2.1 in the original model to about 2.0 persons per household in the updated model.

Table 5
SFPUC Retail Demand Model Updated Single Family Persons Per Household Projection

Year	Original	Updated[1]	% Change
2000	2.7	3.0	11.3%
2005	2.7	3.1	13.1%
2010	2.7	3.2	16.2%
2015	2.7	3.1	15.2%
2020	2.7	3.1	14.3%
2025	2.7	3.1	13.3%
2030	2.7	3.1	12.4%
2035	N/A	3.1	N/A

[1]Updated persons per household projection derived from Census 2000 data and then scaled so that household population computed by multiplying the number of housing units by persons per household equaled the updated population projection in Table 1. Projected persons per household were assumed to be the same in 2030 and 2035.

Table 6
SFPUC Retail Demand Model Updated Multi Family Persons Per Household Projection

Year	Original	Updated[1]	% Change
2000	2.1	1.9	-7.2%
2005	2.1	2.0	-5.7%
2010	2.1	2.0	-3.1%
2015	2.1	2.0	-3.9%
2020	2.1	2.0	-4.7%
2025	2.1	2.0	-5.5%
2030	2.1	2.0	-6.3%
2035	N/A	2.0	N/A

[1] Updated persons per household projection derived from Census 2000 data and then scaled so that household population computed by multiplying the number of housing units by persons per household equaled the updated population projection in Table 1. Projected persons per household were assumed to be the same in 2030 and 2035.

3.2.4 Employment Projection Update

The model's 2010 employment projection is based on EDD employment estimates for City of San Francisco. Projections for 2015 through 2035 were updated to reflect

ABAG's 2009 and draft 2011 employment projections for San Francisco. Total employment levels are based on ABAG's draft 2011 projections while sector shares are based on ABAG's 2009 projections. This was necessary because the draft 2011 projections are not yet available by sector.

The model's original and updated employment projections are shown in Table 7. As shown in this table, current and future employment projections are consistently lower than what the original model included.

Table 7
SFPUC Retail Demand Model Updated Employment Projection

Year	Original	Updated[1]	% Change
2000	634,430	642,500	1.3%
2005	656,480	553,090	-15.7%
2010	690,420	544,056	-21.2%
2015	719,810	569,720	-20.9%
2020	745,600	599,060	-19.7%
2025	770,500	631,790	-18.0%
2030	795,400	665,030	-16.4%
2035	N/A	698,790	N/A

[1] 2010 employment updated to match EDD employment estimates for City of San Francisco. Projections for 2015 through 2035 were updated to reflect ABAG's 2009 and draft 2011 employment projections for San Francisco. Total employment levels are based on ABAG's draft 2011 projections while sector shares are based on ABAG's 2009 projections.

3.2.5 GED Projection Update

The model estimates baseline non-residential water demand as the product of projected employment and average gallons per employee-day (GED) for nine commercial and industrial sectors. The original model's commercial and industrial sectors were based on how ABAG classified employment at the time the model was developed. ABAG's 2009 projections reclassified employment in some sectors, combining the wholesale sector with manufacturing and adding a new Information sector. GED estimates for the new Information sector were not available. Therefore, the GED for this new sector was set to the average GED for the other sectors, 40.9.

The model's original and updated GED estimates are shown in Table 8.

Table 8
SFPUC Retail Demand Model Updated GED Estimates

Employment Sector	Original GED	Updated GED[1]
Agric., Mining	93.8	93.8
Construction	19.1	19.1
Manufacturing	80.1	80.1
Transportation	22.8	22.8
Wholesale	58.7	Not In Model
Information	Not In Model	40.9
Retail Trade	53.9	53.9
F.I.R.E.	18.3	18.3
Services	55.8	55.8
Government	18.3	18.3

[1] GED for Information sector set to the average GED for the other sectors. GEDs for other sectors are the same as in the original model.

3.3 Code/Ordinance Update

The model was updated to account for expected water savings resulting from the following state/city codes and ordinances:

- *AB 715 and California 2010 Green Building Standards Code (Cal Green)* – These requirements prohibit the sale or installation of non high-efficiency toilets (HETs) and urinals starting in 2014. The model assumes that toilets replaced naturally or in response to city ordinances will convert to ULFTs prior to 2014 and HETs thereafter. Similarly, the model assumes that urinals replaced naturally or in response to city ordinances will convert to 1.0 gpf urinals prior to 2014 and 0.5 gpf urinals thereafter.
- *City Retrofit-On-Resale Ordinance* – Starting in 2009, this city ordinance requires replacement of non-ULFT/HET toilets and urinals in residential properties upon resale and replacement of non-ULFT/HET toilets and urinals in commercial properties not later than 2017. Because of AB 715 and Cal Green, the model assumes toilets will convert to ULFTs prior to 2014 and HETs thereafter, and urinals will convert to 1.0 gpf prior to 2014 and 0.5 gpf thereafter.[3] The model

[3] The ordinance also requires the replacement of showerheads with flow rates greater than 2.5 gpm and faucet aerators with flow rates greater than 2.2 gpm. Studies of residential water use in San Francisco have estimated average flow rates for showerheads and faucets below these thresholds. Ordinance

does not assume complete retrofit of toilets and urinals in commercial properties by 2017. Rather, it assumes replacement rates of 4 percent a year in commercial properties, similar to current rates of natural replacement of commercial plumbing fixtures.[4]

- *CEC Clothes Washer Water Efficiency Standards* – CEC has proposed a statewide water efficiency standard for clothes washers of 8.5 WF effective January 1, 2007, and 6.0 WF effective January 1, 2010.[5] However, the federal government has acted to block implementation of the standards, which have yet to take effect. The years in which the standards are assumed to take effect are specified in the "Master_v2.xls" workbook. For the preliminary model run, discussed below, they were set to 2010 (8.5 WF) and 2015 (6.0 WF).

Two ordinances affecting landscape water use were not directly modeled. These were the City's Green Landscaping Ordinance and the Water Efficient Landscape Ordinance. The former is intended to support the use of landscape for screening and greening front setback areas. While the ordinance is designed to encourage responsible water use through "climate appropriate" plantings, lack of implementation data make its potential impact on water demand impossible to predict at this time. San Francisco also recently adopted new requirements for new or modified landscape projects over 1,000 square feet. The ordinance requires that landscape projects be installed, constructed, operated, and maintained in accordance with rules adopted by SCPUC that establish a water budget for outdoor water consumption. As with the Green Landscaping Ordinance, data limitations prevented inclusion of this ordinance in the demand model. Because landscape water use is very small relative to the City's overall retail water demand, excluding these two ordinances from the model is not expected to significantly impact its results.

3.4 Conservation Program Update

The model update included reorganizing and adding to the set of conservation programs in the model. In some cases, the way in which the model tracks plumbing fixture inventories and calculates conservation program water savings was also updated.

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requirements for showerheads and aerators are not expected generate significant incremental water savings and therefore are not modeled directly.

[4] This results in an expected compliance rate of approximately 70 percent by 2017.

[5] WF stands for Water Factor, which measures water use per washer cycle per cubic foot of capacity. Thus an 8.5 WF efficiency standard means that washers cannot exceed 8.5 gallons of water per cycle per cubic foot of capacity, or about 25 gallons per load for a typical washer with 3 cubic feet of capacity.

3.4.1 Single Family Residential Programs

The updated model includes seven different categories of single family residential conservation programs. The original programs and subsequent changes made in the model update are summarized in Table 9.

Table 9
Single Family Residential Conservation Programs Included in SFPUC Demand Model

Program Category	Programs Included	Updated Model Functionality
RSF-1 Clothes Washers	Rebate programs for CEE Tier 1, 2, and 3 washers, plus discontinued rebate program for 8.5 WF washers.	Added rebate programs for Tier 2 and 3 washers. Added CEC washer efficiency standards to model.
RSF-2 Single Family Toilets	Rebate, voucher, and direct install programs for ULFT and HET toilets	Added rebate, voucher, and direct install programs for HETs. Added AB 715 requirements. Updated Retrofit on Resale (ROR) savings calculation to reflect current ordinance requirements.
RSF-3 Public Information	Public outreach and school education programs	Model no longer assigns direct water savings to this program. Instead, it is assumes savings associated with public information are subsumed in the savings estimates of the other programs.
RSF-4 Leak Detection	Residential leak detection and response assistance programs	Unchanged
RSF-5 Surveys	Residential indoor/outdoor surveys/audits	Unchanged
RSF-6 Showerheads	Showerhead distribution/installation programs	Added give-away and direct installation programs for 1.5 gpm showerheads. Added direct installation program for 1.5 gpm showerheads.
RSF-7 Dishwashers	Rebate programs for residential dishwashers	Unchanged

3.4.2 Multi Family Residential Programs

The updated model includes six different categories of multi family residential conservation programs. These programs and changes made during this model update are summarized in Table 10.

Table 10
Multi Family Residential Conservation Programs Included in SFPUC Demand Model

Program Category	Programs Included	Updated Model Functionality
RMF-1 Clothes Washers	Rebate programs for CEE Tier 1, 2, and 3 washers, plus discontinued rebate program for 8.5 WF washers.	Added rebate programs for CEE Tier 2 and 3 washers. Added CEC washer efficiency standards to model.
RMF-2 Multi Family Toilets	Rebate, voucher, and direct install programs for ULFT and HET toilets	Added rebate, voucher, and direct install programs for HETs. Added AB 715 requirements. Updated ROR savings calculation to reflect current ordinance requirements. Costs and savings calculated separately for tank and flushometer toilets
RMF-3 Submetering-Existing	Incentives for submetering existing multi family buildings	Unchanged
RMF-4 Submetering-Existing	Incentives for submetering new multi family buildings	Unchanged
RMF-5 Surveys	Residential indoor/outdoor surveys/audits	Unchanged
RMF-6 Showerheads	Showerhead distribution/installation programs	Added give-away and direct installation programs for 1.5 gpm showerheads. Added direct installation program for 1.5 gpm showerheads.

3.4.3 Non-Residential Programs

The updated model includes 21 different categories of non-residential conservation programs. These programs and changes made as part of this model update are summarized in Table 11.[6]

[6] Program numbering for non-residential programs follows the numbering in the original SFPUC demand model and therefore is not sequential.

Table 11
Non-Residential Conservation Programs Included in SFPUC Demand Model

Program Category	Programs Included	Updated Model Functionality
NR-1 Landscape Audits	Site surveys for large landscape customers	Unchanged
NR-3 Landscape Grants	Customized grants for large landscape efficiency improvements	Updated calculation of water savings
NR-4 CII Audits	Staff and consultant audits of CII facilities	Updated model to separately calculate water savings and program expenditure for staff and consultant audits
NR-5 CII Urinals	CII urinal rebate, voucher, and direct install programs	Added rebate, voucher, and direct install programs for 0.5 gpf and 0.25 gpf urinals. Added AB 715 and Cal Green requirements.
NR-6 CII Toilets	CII toilet rebate, voucher, and direct install programs	Added rebate, voucher, and direct install programs for HETs. Added AB 715 requirements. Costs and savings calculated separately for tank and flushometer toilets.
NR-7 Innovative Incentives – Existing CII	Customized incentives for efficiency improvements to existing CII water uses	Unchanged
NR-8 Innovative Incentives – New CII	Customized incentives for efficiency improvements to new CII water uses	Unchanged
NR-11 Hospital Audits	Hospital water efficiency audit programs	Unchanged
NR-12 Coin Laundries	Rebate programs for CEE Tier 1, 2, and 3 washers, plus discontinued rebate program for 8.5 WF washers.	Added rebate programs for CEE Tier 2 and 3 washers. Added CEC washer efficiency standards to model.
NR-13 School Audits	School/University indoor water efficiency audit programs	Unchanged
NR-14 School Toilets	School/University toilet rebate, voucher, and direct install programs	Added rebate, voucher, and direct install programs for HETs. Added AB 715 requirements. Costs and savings calculated separately for tank and flushometer toilets.
NR-15 School Landscape Audits	School/University outdoor water efficiency audit programs	Unchanged
NR-16 School Artificial Turf Incentives	Customized incentives for replacement of school turf with artificial turf	Unchanged
NR-18/19 Spray Rinse Valve Distribution	Spray rinse valve distribution to restaurants, groceries, and flower shops	Unchanged

Table 11
Non-Residential Conservation Programs Included in SFPUC Demand Model

Program Category	Programs Included	Updated Model Functionality
NR-19a Food Steamer Incentives	Rebate programs for high-efficiency food steamers	Unchanged
NR-20 Cooling Tower Incentives	Financial incentives for cooling tower efficiency improvements	Unchanged
NR-21 City Landscape Efficiency	Grant program for upgrading city landscape systems	Unchanged
NR-22 Water Broom Rebates	Rebate programs for water brooms	Unchanged
NR-23 Hotel Audits	Hotel audit programs	Unchanged
NR-24 Hotel WAVE	EPA-sponsored hotel water use efficiency program (note: program has been discontinued)	Unchanged
NR-25 Hotel Toilets	Hotel toilet rebate, voucher, and direct install programs	Added rebate, voucher, and direct install programs for HETs. Added AB 715 requirements. Costs and savings calculated separately for tank and flushometer toilets.

3.4.4 Program Water Savings and Cost Assumptions

Updated program water savings and cost assumptions for single family residential, multi family residential, and non residential conservation programs included in the model are summarized in Table 12, Table 13, and Table 14. Dollar amounts in these tables are in 2010 dollars. The model requires cost inputs to be expressed in 2005 dollars. Therefore these values were converted to 2005 dollars before they were input into the model.

Table 12
Updated Cost and Savings Assumptions for Single Family Residential Programs

Program Measure	Original Assumption	Updated Assumption	Basis for Update
RSF-1 SF 8.5 WF Rebate	NA	NA	Program no longer offered by SFPUC
RSF-1 SF CEE Tier 1 (WF 6.0) Rebate (a)	NA	NA	Program no longer offered by SFPUC
RSF-1 SF CEE Tier 1 (WF 6.0) Rebate (b)	NA	NA	Program no longer offered by SFPUC
RSF-1 SF CEE Tier 2 (WF 4.5) Rebate	Not In Original Model	$75: Incentive $10: Admin	Changed incentive to $75 based on current proposal Changed admin cost to 13% which translates to current level of $10
RSF-1 SF CEE Tier 3 (WF 4.0) Rebate	Not In Original Model	$75: Incentive $10: Admin	Replicated SF CEE Tier 2 (WF 4.5) Rebate
RSF-2 SF HET Rebate	$100: Incentive $30: Admin $100: Customer	$100: Incentive $66: Admin $100: Customer	Changed admin cost to 66% or current internal cost of $66 Changed customer costs to $100
RSF-2 SF HET Voucher	See above	$214: Incentive $0: Admin $100: Customer	Changed incentive cost to $214 to reflect current rate being charged by the vendor implementing the voucher program Incentive includes vendor admin fees Changed customer cost to $100 to reflect price of installation
RSF-2 SF Direct Install	Not in Original	$632: Utility $45: Admin	Used current cost of $632 for outsourced install fee Changed admin cost to 7% or approximately $45 Changed customer cost to $100
RSF-2 SF ULFT Rebate	NA	NA	No longer available
RSF-2 SF Retrofit on Resale	$10: Utility $2: Admin $65: Customer	$0: Utility $0: Admin $200: Customer	Eliminated costs with understanding that costs are not incurred by PUC Increased customer costs to $200 based on $100 for product and $100 for installation
RSF-3 Public Information	$2: Utility	$2: Utility	Did not change
RSF-4 Leak Detection/Repair	NA	NA	Not implemented Changed measure life to 2 years
RSF-5 Water Surveys	$50: Utility $13: Admin $15: Customer	$250: Utility $0: Admin $50: Customer	Increased utility costs to $250 based on current utility costs Reduced measure life to 2 years based on results from surveys done in early 1990sIncreased customer one-time fixed costs to $50 based

Table 12
Updated Cost and Savings Assumptions for Single Family Residential Programs

Program Measure	Original Assumption	Updated Assumption	Basis for Update
			upon making some repairs and/or upgrades to achieve savings Admin costs now included in utility cost.
RSF-6 SF 1.75 gpm showerheads – give away	NA	NA	No longer available
RSF-6 SF 1.75 gpm showerheads – direct install	NA	NA	No longer available
RSF-6 SF 1.5 gpm showerheads – give away	$1S: Utility $0: Admin $10: Customer	$1S: Utility $0: Admin $0: Customer	Removed customer costs – assumes customer self installs and has no associated costs
RSF-6 SF 1.5 gpm showerheads – direct install	NA	$1S: Utility $0: Admin $0: Customer	Removed customer costs - assumes labor is absorbed in survey costs.
RSF-7 SF Dishwasher	NA	NA	Not implemented

Table 13
Updated Cost and Savings Assumptions for Multi Family Residential Programs

Program Measure	Original Assumption	Updated Assumption	Basis for Update
RMF-1 MF 8.5 WF Rebate	NA	NA	Program no longer offered by SFPUC
RMF-1 MF CEE Tier 1 (WF 6.0) Rebate (a)	NA	NA	Program no longer offered by SFPUC
RMF-1 MF CEE Tier 1 (WF 6.0) Rebate (b)	NA	NA	Program no longer offered by SFPUC
RMF-1 MF CEE Tier 2 (WF 4.5) Rebate	NA	$75: Incentive $10: Admin	Changed incentive to $75 based on current proposal Changed admin cost to 13% which translates to current level of $10
RMF-1 MF CEE Tier 3 (WF 4.0) Rebate	Not in Original	$75: Incentive $10: Admin	Replicated MF CEE Tier 2 (WF 4.5) Rebate
RMF-2 MF HET Rebate - Tank	$100: Incentive $25: Admin $100: Customer	$100: Incentive $35: Admin $100: Customer	Changed admin cost to current internal cost of $35, or 35% of incentive cost.
RMF-2 MF HET Rebate - Flushometer	Not in Original	$300: Incentive $35: Admin $250: Customer	Increased incentive cost to $300 to cover high cost of product and make all flush valves – toilets or urinals, in multi-family or commercial properties Changed admin cost to $35 based upon SFPUC internal costs Changed customer cost to $250 based on an average product and installation cost of $550
RMF-2 MF HET Voucher - Tank	Not in Original	$214: Incentive $0: Admin $100: Customer	Changed incentive cost to $214 to reflect current rate being charged by the vendor implementing the voucher program Incentive includes vendor admin fees Changed customer cost to $100 to reflect price of installation
RMF-2 MF HET Voucher - Flushometer	Not in Original	$367: Incentive $0: Admin $250: Customer	Changed incentive cost to $350 to reflect current rate being charged by the vendor implementing the voucher program Incentive includes vendor admin fees Changed customer cost to $250 to reflect price of installation
RMF-2 MF Direct Install – Tank	Not in Original	$531: Utility $45: Admin $0: Customer	Used current cost of $531 for outsourced install fee for MF tank toilets Changed admin cost to 8% or approximately $45
RMF-2 MF Direct Install – Flushometer	Not in Original	$931: Utility	Used current cost of $931 for outsourced install fee for MF

Table 13
Updated Cost and Savings Assumptions for Multi Family Residential Programs

Program Measure	Original Assumption	Updated Assumption	Basis for Update
		$45: Admin $0: Customer	flushometer toilets Changed admin cost to 5% or approximately $45
RMF-2 MF ULFT Rebate – Tank	NA	NA	Program no longer offered by SFPUC
RMF-2 MF ULFT Rebate – Flushometer	NA	NA	Program no longer offered by SFPUC
RMF-2 MF Retrofit on Resale	$10: Utility $2: Admin $65: Customer	$0: Utility $0: Admin $0: Customer	Eliminated costs with understanding that costs are not incurred by PUC
RMF-3 Submetering Retrofit Incentive	$1,000: Utility $250: Admin $60 per year: Customer	$725: Utility $72.50: Admin $500 Fixed: Customer plus $60 per year: Customer	Changed utility costs to $725 and customer costs to $500 based upon National Submetering and Allocation Billing Program Study (2004) Changed admin to 10%
RMF-4 Submetering Reqt. For New Units	$10: Utility $1: Admin $60 per year: Customer	NA	Eliminated costs with understanding that costs are not incurred by PUC
RMF-5 MF Surveys	Not in Original	$362 per Account: Utility $0: Admin $50: Customer	Changed utiliiy cost to $362 to reflect actual costs, including admin. Based upon contractor fees of $50 per unit multiplied by the average number of units in MF sites Changed customer one-time fixed costs to $50 based upon making some repairs and/or upgrades to achieve savings Downgraded savings to 10%
RMF-6 MF 1.75 gpm showerheads – give away	NA	NA	Program no longer offered by SFPUC
RMF-6 MF 1.75 gpm showerheads – direct install	NA	NA	Program no longer offered by SFPUC
RMF-6 MF 1.5 gpm showerheads – give away	$15: Utility $4: Admin $5: Customer	$15: Utility $0: Admin $0: Customer	Removed customer costs – assumes customer self installs and has not associated costs.

Table 13
Updated Cost and Savings Assumptions for Multi Family Residential Programs

Program Measure	Original Assumption	Updated Assumption	Basis for Update
RMF-6 MF 1.5 gpm showerheads – direct install	Not in Original	$15: Utility $: Admin $0: Customer	Removed customer costs - assumes labor is absorbed in survey costs.

Table 14
Updated Cost and Savings Assumptions for Non Residential Programs

Program	Original Assumption	Updated Assumption	Basis for Update
NR-1 Landscape Audits	$800: Utility $240: Admin $200: Customer	$1,000: Utility $0: Admin $100: Customer	Increased utility cost to $1,000 based upon current market rates Reduced measure life to 5 years Eliminated admin costs Decreased customer one-time fixed costs to $100 based upon making some repairs and/or upgrades to achieve savings
NR-3 Landscape Grants	Not in Original	$271,719: Utility $8,151: Admin $35,000: Customer	Based upon SFPUC current Grant Program statistics
NR-4 SFPUC Staff Water Audits	Not in Original	$328: Utility $0: Admin $0: Customer	Based upon SFPUC internal costs. Utility cost includes admin.
NR-4 Consultant Water Audits	$4,000: Utility $1,000: Admin $2,000: Customer	$10,000: Consultant $0: Admin $0: Customer	Based upon SFPUC current Consultant water audits
NR-5 CII Urinal 0.5 gpf Rebate	Not in Original	$300: Incentive $36: Admin $500: Customer	Increased incentive cost to $300 to cover high cost of product and make all flush valves – toilets or urinals, in multi-family or commercial properties Changed admin cost to $36 based upon SFPUC internal costs Changed customer one-time fixed cost to $500 based upon $400 product costs and $400 install costs

Table 14
Updated Cost and Savings Assumptions for Non Residential Programs

Program	Original Assumption	Updated Assumption	Basis for Update
NR-5 CII Urinal 0.5 gpf Voucher	See Above	See Above	Replicated CII Urinal 0.5 gpf Rebate
NR-5 CII Urinal 0.5 gpf Direct Install	Not in Original ($200 for ULF)	$1,000: Utility $40: Admin $0: Customer	Used install cost of $1,000 based upon current market rates with an additional $200 to cover for union rates
NR-5 CII Urinal 0.25 gpf Rebate	Not in Original	$300: Incentive $36: Admin $500: Customer	Eliminated zero consumption urinals Replicated CII Urinal 0.5 Rebate
NR-5 CII Urinal 0.25 gpf Voucher	See Above	See Above	Replicated CII Urinal 0.25 gpf Rebate and/or Voucher
NR-5 CII Urinal 0.25 gpf Direct Install	Not in Original	$1,000: Utility $40: Admin $0: Customer	Replicated CII Urinal 0.5 gpd Direct Install
NR-6 CII HET Rebate - Tank	Not in Original ($60 for ULFT)	$200: Incentive $36: Admin $75: Customer	Changed incentive to $200 to reflect average incentive for commercial sites. Tank type incentives will typically be $100-$200 while valve type incentives will be $300. Changed customer costs to $75 Changed admin cost to current internal cost of $36
NR-6 CII HET Rebate - Flushometer	Not in Original	$200: Incentive $36: Admin $185: Customer	Changed incentive to $200 to reflect average incentive for commercial sites. Tank type incentives will typically be $100-$200 while valve type incentives will be $300. Changed customer costs to $185 Changed admin cost to current internal cost of $36
NR-6 CII HET Voucher - Tank	See Above	See Above	Replicated CII HET Rebate – Tank
NR-6 CII HET Voucher - Flushometer	See Above	See Above	Replicated CII HET Rebate – Flushometer
NR-6 CII Direct Install – Tank	Not in Original	$692: Utility $45: Admin $0: Customer	Used current cost of $692 for outsourced install fee for MF tank toilets Changed admin cost to 7% or approximately $45
NR-6 CII Direct Install – Flushometer	Not in Original	$920: Utility $45: Admin $0: Customer	Used current cost of $920 for outsourced install fee for MF flushometer toilets Changed admin cost to 5% or approximately $45
NR-6 CII ULFT Rebate – Tank	NA	NA	Program no longer offered by SFPUC

Table 14
Updated Cost and Savings Assumptions for Non Residential Programs

Program	Original Assumption	Updated Assumption	Basis for Update
NR-6 CII ULFT Rebate – Flushometer	NA	NA	Program no longer offered by SFPUC
NR-6 CII Retrofit on Resale	$10: Utility $2: Admin $150: Customer	NA	Not in new model
NR-7 Large Innovative Retrofits Incentive	$2,700: Utility $4,000: Consultant $2,700: Admin $50,000: Customer	$153,666: Utility $1,536: Admin $150,000: Customer	Used numbers from the Water Saver Program includes audits and incentives including average savings of 14,730 gpd
NR-8 Large New Project Incentives	NA	NA	Same as Large Innovative Project Retrofits but for new construction Program no longer offered by SFPUC
NR-11 Audits-Hospital	$2,300: Utility $575: Admin $5,000: Customer	$3,000: Utility $300: Admin $300: Customer	Changed audit costs to $3,000 based upon current market rates Reduced measure life to 2 years Increased customer one-time fixed costs to $300 based upon making some repairs and/or upgrades to achieve savings Changed admin costs to 10%
NR-12 Coin-Op 8.5 WF Rebate	NA	NA	Program no longer offered by SFPUC
NR-12 Coin-Op CEE Tier 1 (WF 6.0) Rebate (a)	NA	NA	Program no longer offered by SFPUC
NR-12 Coin-Op CEE Tier 1 (WF 6.0) Rebate (b)	NA	NA	Program no longer offered by SFPUC
NR-12 Coin-Op CEE Tier 2 (WF 4.5) Rebate	Not In Original	$75: Incentive $10: Admin	Changed incentive to $75 based on current proposal Changed admin cost to 13% which translates to current level of $10
NR-12 Coin-Op CEE Tier 3 (WF 4.0) Rebate	Not in Original	$75: Incentive $10: Admin	Changed incentive to $75 based on current proposal Changed admin cost to 13% which translates to current level of $10
NR-13 Audits-Schools/Universities	$1,000: Utility $150: Admin $2,000: Customer	$3,000: Utility $300: Admin $450: Customer	Changed audit costs to $3,000 based upon current market rates Reduced measure life to 2 years Decreased customer one-time fixed costs to $300 based upon making some repairs and/or upgrades to achieve savings Changed admin costs to 15%
NR-14 SCH HET Rebate - Tank	$400: Incentive $120: Admin $100: Customer	$265: Incentive $66: Admin $0: Customer	Changed incentive to proposed incentive of $265 Changed customer costs to $0 which assumes customer can procure product and installation cost of $165

Table 14
Updated Cost and Savings Assumptions for Non Residential Programs

Program	Original Assumption	Updated Assumption	Basis for Update
			Changed admin cost to 40% or current internal cost of $66
NR-14 SCH HET Rebate - Flushometer	$400: Incentive $120: Admin $100: Customer	$530: Incentive $66: Admin $0: Customer	Changed incentive to proposed incentive of $530 Changed customer costs to $0 which assumes customer can procure product and installation cost of $530 Changed admin cost to 40% or current internal cost of $66
NR-14 SCH HET Voucher - Tank	See Above	See Above	Replicated CII HET Rebate – Tank
NR-14 SCH HET Voucher - Flushometer	See Above	See Above	Replicated CII HET Rebate – Flushometer
NR-14 SCH Direct Install – Tank	Not in Original	$692: Utility $45: Admin $0: Customer	Used current cost of $692 for outsourced install fee for MF tank toilets Changed admin cost to 7% or approximately $45
NR-14 SCH Direct Install – Flushometer		$920: Utility $45: Admin $0: Customer	Used current cost of $920 for outsourced install fee for MF flushometer toilets Changed admin cost to 5% or approximately $45
NR-14 SCH ULFT Rebate – Tank	NA	NA	Program no longer offered by SFPUC
NR-14 SCH ULFT Rebate – Flushometer	NA	NA	Program no longer offered by SFPUC
NR-15 Audits-Schools/University Landscaping	$1,000: Utility $150: Admin $2,000: Customer	$800: Utility $80: Admin $100: Customer	Increased costs to $800 based upon current market costs Reduced measure life to 2 years Reduced savings to 10% Changed admin to 10% Increased customer one-time fixed costs to $100 based upon making some repairs and/or upgrades to achieve savings
NR-16 School/University Artificial Turf	NA	NA	Program no longer offered by SFPUC
NR-18 Low Flow Sprayers-Grocery Flower	$130: Utility $20: Admin $75: Customer	$140: Utility $0: Admin $0: Customer	Changed cost to $140 to reflect current SFPUC costs and assumes self installed Reduced savings to 60 gpd based upon current CUWCC studies and assumes 50% install rate
NR-19 Low Flow Sprayers-Restaurants	$130: Utility $20: Admin $75: Customer	$140: Utility $0: Admin $0: Customer	Replicated Low Flow Sprayers-Grocery Flower Program
NR-19a Steamers-Restaurants	$300: Utility	$300: Utility	Reduced incentive to $300 based upon incentive offered by other

Table 14
Updated Cost and Savings Assumptions for Non Residential Programs

Program	Original Assumption	Updated Assumption	Basis for Update
	$45: Admin -$300: Customer	$30: Admin $0: Customer	utilities Changed admin cost to 10% or $30 Changed customer cost to $0 because currently the product costs the same as a standard steamer
NR-20 Cooling Towers	NA	NA	Program no longer offered by SFPUC
NR-21 City/PUC Landscape	$800: Utility $240: Admin $200: Customer	$800: Utility $80: Admin $100: Customer	Reduced measure life to 2 years Changed savings to 10% Changed admin to 10% Decreased customer one-time fixed costs to $100 based upon making some repairs and/or upgrades to achieve savings
NR-22 Water Broom	NA	NA	Not implemented
NR-23 Audits-Hotels/Motels	$3,000: Utility $750: Admin $2,000: Customer	$3,000: Utility $300: Admin $300: Customer	Reduced measure life to 2 years Changed savings to 10% Decreased customer one-time fixed costs to $300 based upon making some repairs and/or upgrades to achieve savings Changed admin costs to 10%
NR-24 WAVE Program	NA	NA	Program no longer offered by SFPUC
NR-25 HTL HET Rebate - Tank	Not in Original	$165: Incentive $66: Admin $0: Customer	Changed incentive to proposed incentive of $165 Changed customer costs to $0 which assumes customer can procure product and installation cost of $165 Changed admin cost to 40% or current internal cost of $66
NR-25 HTL HET Rebate - Flushometer	Not in Original	$165: Incentive $66: Admin $185: Customer	Changed incentive to proposed incentive of $165 Changed customer costs to $185 based upon bulk purchasing of tank flushometer toilet for $200 and paying $150 for installation Changed admin cost to current internal cost of $66
NR-25 HTL HET Voucher - Tank	Not in Original	See Above	Replicated CII HET Rebate – Tank
NR-25 HTL HET Voucher - Flushometer	Not in Original	See Above	Replicated CII HET Rebate – Flushometer
NR-25 HTL Direct Install – Tank	Not in Original	$692: Utility $45: Admin $0: Customer	Used current cost of $692 for outsourced install fee for MF tank toilets Changed admin cost to 7% or approximately $45

Table 14
Updated Cost and Savings Assumptions for Non Residential Programs

Program	Original Assumption	Updated Assumption	Basis for Update
NR-25 HTL Direct Install – Flushometer	Not in Original	$920: Utility $45: Admin $0: Customer	Used current cost of $920 for outsourced install fee for MF flushometer toilets Changed admin cost to 5% or approximately $45
NR-25 HTL ULFT Rebate – Tank	Not in Original	NA	Program no longer offered by SFPUC
HTL ULFT Rebate – Flushometer	Not in Original	NA	Program no longer offered by SFPUC

3.4.5 Model Calibration

The updated model was calibrated to actual customer class demands (with meter correction)[7] for 2000 and 2005. Table 15 shows the percentage difference between actual and predicted demands in each year. In 2000, the model slightly under predicted multi family demand and over predicted non-residential demand. The model closely tracked single family demand in both calibration years. Other demands, which consist of Builders and Contractors (B&C) and Docks and Shipping (D&S) customers, are fixed in the model at their historic average of 0.2 mgd, and are not adjusted as part of model calibration. Overall, the updated model closely tracks actual demands in 2000 and 2005. It is within about 2 percent of actual retail demand in 2000 and within about 1 percent of actual retail demand in 2005.

Table 15
SFPUC Model Calibration

Demand Class	Actual (mgd)	Model (mgd)	% Difference
Year: 2000			
Single Family	19.4	19.3	-0.5%
Multi Family	29.4	28.6	-2.7%
Non-Residential	28.1	30.9	+9.9%
Other*	0.3	0.2	-33.3%
Retail Demand	***77.2***	***79.0***	***+2.3%***
Year: 2005			
Single Family	18.8	18.7	-0.5%
Multi Family	28.3	28.4	+0.4%
Non-Residential	25.3	25.9	+2.4%
Other*	0.2	0.2	+0.0%
Retail Demand	***72.6***	***73.2***	***+0.8%***
*Other (B&C, D&S): Builders and Contractors, Docks and Shipping.			

The calibrated model over predicts 2010 retail demand by about 7 percent. This over prediction was expected for three reasons. First, the very wet spring and cool summer California experienced in 2010 depressed urban water demand across the state. Second, 2008 and 2009 were both dry and households and businesses were encouraged to conserve water, and while rainfall returned to normal or above normal in 2010, conservation messaging continued through most of the year. Third, the sharp economic decline which started in 2008 pushed down commercial and industrial demands. While the model does a good job of capturing employment-related changes in demand, it may not be picking up changes in the residential sector related to the home foreclosure crisis.

[7] SFPUC estimates that residential retail meters under-read consumption by 2.2 percent on average while non-residential meters under-read by about 2.1 percent. Metered sales were therefore increased accordingly to estimate actual water demand.

This is not cause for concern about the model's calibration. The model is calibrated to long-term weather and economic conditions and is not going to precisely mirror temporary perturbations in demand caused by unusual weather or economic circumstances.

4 Model Results

4.1 In-City Demand Projections

In-city retail water demand projections are summarized in Tables 16 and 17. Table 16 shows projected demands in five year increments between 2005 and 2035. Table 17 shows projected demands in two years increments between 2010 and 2020.

Three projections are presented in the tables:

1. Baseline demands excluding plumbing efficiency codes and SFPUC conservation programs.
2. Baseline demands adjusted for plumbing efficiency codes but excluding SFPUC conservation programs.
3. Demands adjusted for plumbing efficiency codes and including SFPUC conservation programs

Separate demands are estimated for single-family, multi-family, non-residential, and "other" customer segments.[8] Additionally, system losses are estimated at 6.9% of the adjusted baseline demand.[9]

4.1.1 Baseline In-City Demands Excluding Plumbing Efficiency Codes and SFPUC Conservation Programs

This projection is generated by turning off all the plumbing efficiency codes and conservation programs in the model. It provides a reference demand from which the impact of plumbing efficiency codes can be measured. Demand under this projection is driven by population and employment growth only. Residential end use efficiency and water use per employee-day estimates are fixed at initial model levels. The result is projected demand assuming no changes in water use efficiency over time. Under this projection, total in-city retail demand is projected to increase from 80.2 mgd in 2005 to 96.8 mgd in 2035, an increase of 20.7%. The fluctuations in per capita demand under this projection are caused by variation in the employment forecast.

4.1.2 Adjusted Baseline In-City Demands Including Plumbing Efficiency Codes

The effects of plumbing efficiency codes over time are shown in the second demand projection. This projection shows expected in-city retail demands given projected population and

[8] Other demands consist of demands from the Builders & Contractors (B&S) and Docks & Shipping (D&S) customer accounts.

[9] System losses do not include meter under-registration losses, which are included in the customer demands.

employment growth, codes and ordinances, but not implementation of SFPUC conservation programs. Under the adjusted baseline demand projection:

- Single-family residential demand decreases by approximately 15% between 2005 and 2035. The reduction is driven by increased water use efficiency of toilets, clothes washers, and showerheads coupled with very limited growth in the number of single-family residential accounts.
- Multi-family residential demands do not change significantly over the forecast period. While per capita demand falls as a result of code effects, this is offset by projected growth in the number of multi-family residential customers.
- Non-residential demands are projected to increase by 17% between 2005 and 2035. The increase is driven by projected increases in employment. While water use per employee is expected to decrease by 14% over the forecast period, total employment is projected to increase by 26%.
- Overall, adjusted baseline in-city retail demand is projected to increase from 78.0 mgd in 2005 to 79.7 mgd in 2035, an increase of 1.7 mgd, or 2.2%.
- The impact of plumbing efficiency codes is measured as the difference between the unadjusted and adjusted baseline demand projections. Code savings are 10.9 mgd by 2020 and 17.1 mgd by 2035.

Under the original model specification, baseline retail demands were 82.5 mgd in 2020 and 83.8 mgd in 2030.[10] However, this included double counting water losses associated with customer meter under-registration. After correcting for the double counting, baseline demands under the original model specification are 80.8 mgd and 82.1 mgd in 2020 and 2030, respectively. Using the updated model, baseline demands adjusted for codes are 77.1 mgd and 78.2 mgd in 2020 and 2030, respectively. The reduction in projected demands is primarily a consequence of the lower employment forecast in the updated model.

4.1.3 In-City Demand Including SFPUC Conservation Programs

This projection includes actual and projected conservation program implementation for the period 2005 to 2035. The conservation programs, program durations, and annual levels of activity used to generate the projection are summarized in Table 18. Program durations and annual levels of activity were provided by SFPUC staff. Conservation programs are assumed to operate through 2035 with the exception of single-family toilet programs, non-residential toilet and urinal programs, and single-family washer rebate programs, which end earlier because full market penetration is realized.

The impact of SFPUC conservation programs is measured as the difference between this projection and the adjusted baseline projection. Conservation program water savings over the forecast period are as follows:

[10] These values are taken from Table 13 in "City and County of San Francisco Retail Water Demands and Conservation Potential."

- Single-family demands are reduced by 2.0 mgd by 2020 and by 1.8 mgd by 2035.[11]
- Multi-family demands are reduced by 1.7 mgd by 2020 and by 2.2 mgd by 2035.
- Non-residential demands are reduced by 1.7 mgd by 2020 and by 2.0 mgd by 2035.
- Total conservation program water savings in 2020 are 5.4 mgd in 2020 and 6.0 mgd in 2035.

Updated conservation programs water savings are approximately 30% higher in 2020 and 35% higher in 2030 than under the original model specification. The difference reflects changes in the mix, duration, and level of implementation of conservation programs in the updated model.

4.1.4 In-City Retail Water Sales

Projected in-city retail water sales with and without SFPUC conservation programs for the period 2010 to 2030 are shown in Table 19 and Table 20. Retail sales are calculated as total projected demands less system losses and meter under-registration. Together, system losses and meter under-registration are approximately 9 to 10% of retail demand. Thus, projected sales are about 90 to 91% of projected retail demand.

4.2 Total Retail Demand Projections

Total retail demands are the sum of the following demands:

- In-city retail demand, including system losses
- Other retail customer demands, including SFO, the US Navy, and other suburban/municipal accounts.
- Groveland Community Services District
- Lawrence Livermore Laboratory
- City irrigation demand served by groundwater, including irrigation at Golden Gate Park, Great Highway Median, SF Zoo
- Castlewood & Sunol Golf Course demands served by groundwater

The projections of total retail demands for the period 2010 to 2035 with and without SFPUC conservation are shown in Table 21 and Table 22. In-city retail demands are estimated with the demand model. The projections for the other categories of retail demand were provided by SFPUC and are based on historic deliveries.

[11] The reduction in active program water savings is a consequence of ending single-family toilet and washer programs prior to 2035 due to market saturation. Overall savings – the sum of code and program savings – between 2020 and 2035 increases, however, from 5.4 to 6.8 mgd.

Table 16
SFPUC In-City Retail Demand Projection: 2005 – 2035
(mgd)

Single Family In-City Retail Demand	2005	2010	2015	2020	2025	2030	2035
Baseline Demand without Codes or SFPUC Conservation Programs	**19.6**	**20.3**	**20.4**	**20.5**	**20.5**	**20.6**	**20.9**
Less Savings from Codes	*0.9*	*1.6*	*2.5*	*3.4*	*4.1*	*4.6*	*5.0*
Adjusted Baseline Demand	**18.7**	**18.7**	**17.9**	**17.1**	**16.5**	**16.0**	**15.8**
Less Savings from 2005-30 SFPUC Conservation Programs	*0.0*	*0.6*	*1.5*	*2.0*	*2.2*	*2.1*	*1.8*
Demand with Codes & SFPUC Conservation Programs	**18.7**	**18.1**	**16.4**	**15.1**	**14.3**	**14.0**	**14.0**
Savings from Codes & SFPUC Conservation Programs	*0.9*	*2.2*	*4.0*	*5.4*	*6.3*	*6.7*	*6.8*
Multi Family In-City Retail Demand							
Baseline Demand without Codes or SFPUC Conservation Programs	**29.7**	**32.0**	**33.1**	**34.3**	**35.5**	**36.8**	**38.1**
Less Savings from Codes	*1.3*	*2.6*	*4.2*	*5.9*	*7.3*	*8.5*	*9.5*
Adjusted Baseline Demand	**28.4**	**29.3**	**28.9**	**28.4**	**28.2**	**28.3**	**28.6**
Less Savings from 2005-30 SFPUC Conservation Programs	*0.0*	*0.2*	*1.2*	*1.7*	*2.0*	*2.1*	*2.2*
Demand with Codes & SFPUC Conservation Programs	**28.4**	**29.2**	**27.8**	**26.7**	**26.2**	**26.2**	**26.4**
Savings from Codes & SFPUC Conservation Programs	*1.3*	*2.8*	*5.4*	*7.6*	*9.3*	*10.6*	*11.7*
Non Residential In-City Retail Demand							
Baseline Demand without Codes or SFPUC Conservation Programs	**25.7**	**25.3**	**26.7**	**28.1**	**29.5**	**31.0**	**32.5**
Less Savings from Codes	*0.1*	*0.6*	*1.1*	*1.6*	*2.0*	*2.3*	*2.6*
Adjusted Baseline Demand	**25.6**	**24.6**	**25.6**	**26.5**	**27.5**	**28.7**	**29.9**
Less Savings from 2005-30 SFPUC Conservation Programs	*0.0*	*0.7*	*1.4*	*1.7*	*1.9*	*2.0*	*2.0*
Demand with Codes & SFPUC Conservation Programs	**25.6**	**24.0**	**24.3**	**24.8**	**25.5**	**26.7**	**27.9**
Savings from Codes & SFPUC Conservation Programs	*0.1*	*1.3*	*2.5*	*3.3*	*3.9*	*4.3*	*4.6*
Other (mgd)							
Builders & Contractors, Docks & Shipping	0.2	0.2	0.2	0.2	0.2	0.2	0.2
System Losses Excluding Meter Under-Registration[1]							
Calculated as % of Adjusted Baseline Demand	5.0	5.0	5.0	4.9	5.0	5.0	5.1
Total In-City Retail Demand							
Baseline Demand without Codes or SFPUC Conservation Programs	**80.2**	**82.7**	**85.5**	**88.0**	**90.7**	**93.7**	**96.8**
Less Savings from Codes	*2.2*	*4.9*	*7.8*	*10.9*	*13.4*	*15.4*	*17.1*
Adjusted Baseline Demand	**78.0**	**77.9**	**77.7**	**77.1**	**77.3**	**78.2**	**79.7**
Less Savings from 2005-30 SFPUC Conservation Programs	*0.0*	*1.4*	*4.1*	*5.4*	*6.1*	*6.2*	*6.0*
Demand with Codes & SFPUC Conservation Programs	**78.0**	**76.4**	**73.6**	**71.7**	**71.2**	**72.1**	**73.7**
Savings from Codes & SFPUC Conservation Programs	*2.3*	*6.3*	*11.8*	*16.3*	*19.5*	*21.6*	*23.1*
Per Capita Demand (Gal/Day/Person)							
Baseline Demand without Codes or SFPUC Conservation	102	99	100	101	101	102	103
Baseline Demand Adjusted for Codes Only	99	93	91	88	86	85	85
Baseline Demand Adjusted for Codes and SFPUC Conservation	99	92	86	82	80	79	78

[1] Meter under-registration losses are included in the retail demands for residential and non-residential sectors. Meter under-registration losses estimated at 2.2% of residential and 2.1% of non-residential sector demands. System losses excluding meter under-registration estimated at 6.86% of sector demand of the "codes only" demand projection.

Table 17
SFPUC In-City Retail Demand Projections: 2010 – 2020
(mgd)

Single Family In-City Retail Demand	2010	2012	2014	2016	2018	2020
Baseline Demand without Codes or SFPUC Conservation Programs	20.1	20.3	20.3	20.4	20.4	20.4
Less Sovings from Codes	*1.5*	*1.8*	*2.1*	*2.5*	*2.8*	*3.2*
Adjusted Baseline Demand	18.7	18.5	18.2	17.9	17.6	17.2
Less Savings from 2005-30 SFPUC Conservotion Programs	*0.6*	*1.1*	*1.5*	*1.8*	*2.0*	*2.2*
Demand with Codes & SFPUC Conservation Programs	18.1	17.4	16.7	16.1	15.6	15.1
Savings from Codes & SFPUC Conservation Progroms	*2.1*	*2.9*	*3.6*	*4.2*	*4.8*	*5.3*
Multi Family In-City Retail Demand						
Baseline Demand without Codes or SFPUC Conservation Programs	31.5	32.2	32.7	33.1	33.6	34.1
Less Savings from Codes	*2.4*	*2.9*	*3.6*	*4.2*	*4.9*	*5.6*
Adjusted Baseline Demand	29.2	29.3	29.1	28.9	28.7	28.5
Less Sovings from 2005-30 SFPUC Conservation Programs	*0.0*	*0.6*	*1.0*	*1.4*	*1.6*	*1.8*
Demand with Codes & SFPUC Conservation Programs	29.2	28.6	28.0	27.6	27.1	26.7
Sovings from Codes & SFPUC Conservation Programs	*2.3*	*3.6*	*4.6*	*5.6*	*6.5*	*7.4*
Non Residential In-City Retail Demand						
Baseline Demand without Codes or SFPUC Conservation Programs	25.3	25.6	26.1	26.7	27.3	27.8
Less Sovings from Codes	*0.5*	*0.7*	*0.9*	*1.1*	*1.3*	*1.5*
Adjusted Baseline Demand	24.8	24.8	25.2	25.6	26.0	26.3
Less Sovings from 2005-30 SFPUC Conservotion Programs	*0.9*	*0.8*	*1.0*	*1.3*	*1.4*	*1.5*
Demand with Codes & SFPUC Conservation Programs	24.0	24.1	24.2	24.4	24.6	24.8
Sovings from Codes & SFPUC Conservation Programs	*1.4*	*1.5*	*2.0*	*2.4*	*2.7*	*3.1*
Other						
Builders & Contractors, Docks & Shipping	0.2	0.2	0.2	0.2	0.2	0.2
System Losses Excluding Meter Under-Registration[1]						
Calculated as % of Adjusted Baseline Demand	5.0	5.0	5.0	5.0	5.0	5.0
Total In-City Retail Demand						
Baseline Demand without Codes or SFPUC Conservation Programs	82.2	83.3	84.4	85.5	86.5	87.5
Less Sovings from Codes	*4.3*	*5.4*	*6.6*	*7.8*	*9.0*	*10.3*
Adjusted Baseline Demand	77.9	77.8	77.8	77.7	77.5	77.2
Less Savings from 2005-30 SFPUC Conservotion Programs	*1.5*	*2.5*	*3.6*	*4.4*	*5.0*	*5.5*
Demand with Codes & SFPUC Conservation Programs	76.4	75.3	74.2	73.3	72.5	71.8
Savings from Codes & SFPUC Conservation Programs	*5.8*	*8.0*	*10.2*	*12.2*	*14.0*	*15.8*
Per Capita Demand (Gal/Day/Person)						
Baseline Demand without Codes or SFPUC Conservation Programs	98	99	99	100	100	100
Adjusted Baseline Demand	93	92	91	90	89	88
Demand with Codes & SFPUC Conservation Programs	92	89	87	85	84	82

[1] Meter under-registration losses are included in the retail demands for residential and non-residential sectors. Meter under-registration losses estimated at 2.2% of residential and 2.1% of non-residential sector demands. System losses excluding meter under-registration estimated at 6.86% of sector demand of the "codes only" demand projection.

Table 18
Conservation Program Durations and Activity Levels Used to Generate Conservation Demand Projection

			Program Start Year	Program End Year	Program Length	Units Per Year
RESIDENTIAL SINGLE FAMILY (1-RSFConsMeas.xls)						
RSF-1	d	SF CEE Tier 2 (WF 4.5) Rebate	2010	2011	2	4,240
RSF-1	e	SF CEE Tier 3 (WF 4.0) Rebate	2011	2030	20	5,300
RSF-2	a	SF HET Rebate	2011	2025	15	1,600
RSF-2	c	SF HET Direct Install	2011	2025	15	2,000
RSF-2	e	SF Retrofit on Resale[1]	2009	2035	27	3.2%
RSF-3	a	Public Information	2005	2035	31	NA
RSF-5	a	Water Surveys[1]	2011	2035	25	2.0%
RSF-6	c	SF 1.5 gpm showerheads - give away	2011	2035	25	1,000
RSF-6	d	SF 1.5 gpm showerheads - direct install	2011	2035	25	2,400
RESIDENTIAL MULTI FAMILY (1-RMFConsMeas.xls)						
RMF-1	d	MF CEE Tier 2 (WF 4.5) Rebate	2010	2011	2	480
RMF-1	e	MF CEE Tier 3 (WF 4.0) Rebate	2011	2035	25	600
RMF-2	a	MF HET Rebate - Tank	2011	2035	25	1,300
RMF-2	b	MF HET Rebate - Flushometer	2011	2035	25	100
RMF-2	c	MF HET Voucher - Tank	2011	2035	25	1,000
RMF-2	d	MF HET Voucher - Flushometer	2011	2035	25	1,000
RMF-2	e	MF HET Direct Install - Tank	2011	2035	25	300
RMF-2	f	MF HET Direct Install - Flushometer	2011	2035	25	200
RMF-2	i	MF Retrofit on Resale[1]	2009	2035	27	1.1%
RMF-5	a	Water Surveys	2011	2035	25	
RMF-6	c	MF 1.5 gpm showerheads - give away	2011	2035	25	1,500
RMF-6	d	MF 1.5 gpm showerheads - direct install	2011	2035	25	500
NON-RESIDENTIAL MEASURES (3-NRConsMeas.xls)						
NR-1	a	Lscape-Audits[2]	2011	2035	25	5.0%
NR-3	a	Lscape-Grants	2011	2035	25	4
NR-4	a	SFPUC Staff Water Audits[3]	2011	2035	25	1.0%
NR-4	b	Consultant Water Audits	2011	2035	25	7
NR-5	a	CII Urinal 0.5 gpf Rebate	2011	2034	24	200
NR-5	d	CII Urinal 0.25 gpf Rebate	2011	2035	25	100
NR-6	a	CII HET Rebate - Tank	2011	2027	17	1,500
NR-6	b	CII HET Rebate - Flushometer	2011	2033	23	400
NR-7	a	Large Innovative Retrofit Incentives	2011	2035	25	1
NR-12	d	Coin-Op CEE Tier 2 (WF 4.5) Rebate	2011	2012	2	54
NR-12	e	Coin-Op CEE Tier 3 (WF 4.0) Rebate	2011	2035	25	60
NR-19	a	Low Flow Sprayers-Restaurants	2011	2035	25	60

[1] Percent of residential housing units.
[2] Percent of accounts with large landscapes.
[3] Percent of CII accounts.

Table 19
SFPUC In-City Retail Sales Projection Without SFPUC Conservation
(mgd)

In-City Retail Demand	2010	2015	2020	2025	2030	2035
Single Family Demand Projection	18.7	17.9	17.1	16.5	16.0	15.8
Less Meter Under-Registration[1]	*0.6*	*0.6*	*0.6*	*0.5*	*0.5*	*0.5*
Single Family Sales Projection	**18.1**	**17.3**	**16.5**	**15.9**	**15.5**	**15.3**
Multi Family Demand Projection	29.3	28.9	28.4	28.2	28.3	28.6
Less Meter Under-Registration[1]	*1.0*	*1.0*	*0.9*	*0.9*	*0.9*	*0.9*
Multi Family Sales Projection	**28.4**	**28.0**	**27.4**	**27.3**	**27.4**	**27.7**
Non Residential Demand Projection	24.6	25.6	26.5	27.5	28.7	29.9
Less Meter Under-Registration[1]	*0.8*	*0.8*	*0.9*	*0.9*	*0.9*	*1.0*
Non Residential Sales Projection	**23.8**	**24.8**	**25.6**	**26.5**	**27.7**	**28.9**
Other Sales (D&C, B&S)[2]	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
In-City Retail Sales Projection	**70.5**	**70.3**	**69.8**	**70.0**	**70.8**	**72.1**
Meter Under-Registration[1]	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.5*
Other System Losses[3]	*5.0*	*5.0*	*4.9*	*5.0*	*5.0*	*5.1*
Total In-City Retail Demand	**77.9**	**77.7**	**77.1**	**77.3**	**78.2**	**79.7**

[1] Meter under-registration losses estimated at 2.2% of residential and 2.1% of non-residential sector demands.

[2] Docks & Shipping (D&C), Buliders & Contractors (B&C)

[3] Other system losses exluding meter under-registration estimated at 6.86% of sector demand of the "codes only" demand projection.

Table 20
SFPUC In-City Retail Sales Projection With SFPUC Conservation
(mgd)

In-City Retail Demand	2010	2015	2020	2025	2030	2035
Single Family Demand Projection	18.1	16.4	15.1	14.3	14.0	14.0
Less Meter Under-Registration[1]	*0.6*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
Single Family Sales Projection	**17.5**	**15.8**	**14.6**	**13.8**	**13.5**	**13.6**
Multi Family Demand Projection	29.2	27.8	26.7	26.2	26.2	26.4
Less Meter Under-Registration[1]	*1.0*	*0.9*	*0.9*	*0.9*	*0.9*	*0.9*
Multi Family Sales Projection	**28.2**	**26.8**	**25.8**	**25.4**	**25.3**	**25.5**
Non Residential Demand Projection	24.0	24.3	24.8	25.5	26.7	27.9
Less Meter Under-Registration[1]	*0.8*	*0.8*	*0.8*	*0.8*	*0.9*	*0.9*
Non Residential Sales Projection	**23.2**	**23.5**	**23.9**	**24.7**	**25.8**	**27.0**
Other Sales (D&C, B&S)[2]	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
In-City Retail Sales Projection	**69.1**	**66.4**	**64.6**	**64.1**	**64.8**	**66.3**
Meter Under-Registration[1]	*2.3*	*2.3*	*2.2*	*2.2*	*2.2*	*2.3*
Other System Losses[3]	*5.0*	*5.0*	*4.9*	*5.0*	*5.0*	*5.1*
Total In-City Retail Demand	**76.4**	**73.6**	**71.7**	**71.2**	**72.1**	**73.7**

[1] Meter under-registration losses estimated at 2.2% of residential and 2.1% of non-residential sector demands.

[2] Docks & Shipping (D&C), Builders & Contractors (B&C)

[3] Other system losses excluding meter under-registration estimated at 6.86% of sector demand of the "codes only" demand projection.

Table 21
SFPUC Total Retail Demands Without SFPUC Conservation
(mgd)

	2010	2015	2020	2025	2030	2035
In-City Retail Demands						
Single Family[1]	18.7	17.9	17.1	16.5	16.0	15.8
Multi Family[1]	29.3	28.9	28.4	28.2	28.3	28.6
Non Residential[1]	24.6	25.6	26.5	27.5	28.7	29.9
Other In-City Sales (D&C, B&S)[2]	0.2	0.2	0.2	0.2	0.2	0.2
In-City Subtotal	***72.9***	***72.7***	***72.2***	***72.4***	***73.2***	***74.6***
Unaccounted-for System Losses[3]	*5.0*	*5.0*	*4.9*	*5.0*	*5.0*	*5.1*
Total In-City Retail Demand[4]	**77.9**	**77.7**	**77.1**	**77.3**	**78.2**	**79.7**
Other Retail Customers						
Other Retail Demands[5]	3.8	3.8	3.8	3.8	3.8	3.8
Groveland Community Services District	0.4	0.4	0.4	0.4	0.4	0.4
Lawrence Livermore Laboratory	0.8	0.8	0.8	0.8	0.8	0.8
Total Other Retail Demand	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**
Total Retail RWS Watershed Demand	**82.9**	**82.7**	**82.1**	**82.3**	**83.2**	**84.7**
Groundwater Demand						
City Irrigation Demand[6]	1.5	1.5	1.5	1.5	1.5	1.5
Castlewood & Sunol Golf Course Demand[7]	0.7	0.7	0.7	0.7	0.7	0.7
Total Groundwater Demand	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**
Total Retail RWS Demand	**85.1**	**84.9**	**84.3**	**84.5**	**85.4**	**86.9**

[1] Includes the impact of water savings due to water efficiency codes and ordinances.
[2] Docks & Shipping (D&S), Builders & Contractors (B&S)
[3] Unaccounted-for system losses estimated at 6.9% of total in-city demand, excluding SFPUC conservation program savings.
[4] Actual in-city use in FY 09/10 was 71.4 mgd.
[5] US Navy, SFO, and other suburban/municipal accounts. Does not include groundwater at Sunol and Castlewood. Demands are based on average use from 2000-2010.
[6] City irrigation at Golden Gate Park, Great Highway Median, and SF Zoo.

Table 22
SFPUC Total Retail Demands With SFPUC Conservation
(mgd)

	2010	2015	2020	2025	2030	2035
In-City Retail Demands						
Single Family[1]	18.1	16.4	15.1	14.3	14.0	14.0
Multi Family[1]	29.2	27.8	26.7	26.2	26.2	26.4
Non Residential[1]	24.0	24.3	24.8	25.5	26.7	27.9
Other In-City Sales (D&C, B&S)[2]	0.2	0.2	0.2	0.2	0.2	0.2
In-City Subtotal	***71.4***	***68.6***	***66.8***	***66.3***	***67.0***	***68.6***
Unaccounted-for System Losses[3]	*5.0*	*5.0*	*4.9*	*5.0*	*5.0*	*5.1*
Total In-City Retail Demand[4]	**76.4**	**73.6**	**71.7**	**71.2**	**72.1**	**73.7**
Other Retail Customers						
Other Retail Demands[5]	3.8	3.8	3.8	3.8	3.8	3.8
Groveland Community Services District	0.4	0.4	0.4	0.4	0.4	0.4
Lawrence Livermore Laboratory	0.8	0.8	0.8	0.8	0.8	0.8
Total Other Retail Demand	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**
Total Retail RWS Watershed Demand	**81.4**	**78.6**	**76.7**	**76.2**	**77.1**	**78.7**
Groundwater Demand						
City Irrigation Demand[6]	1.5	1.5	1.5	1.5	1.5	1.5
Castlewood & Sunol Golf Course Demand[7]	0.7	0.7	0.7	0.7	0.7	0.7
Total Groundwater Demand	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**
Total Retail RWS Demand	**83.6**	**80.8**	**78.9**	**78.4**	**79.3**	**80.9**

[1] Includes the impact of water savings due to water efficiency codes and ordinances and SFPUC conservation programs.
[2] Docks & Shipping (D&S), Builders & Contractors (B&S)
[3] Unaccounted-for system losses estimated at 6.9% of total in-city demand, excluding SFPUC conservation program savings.
[4] Actual in-city use in FY 09/10 was 71.4 mgd.
[5] US Navy, SFO, and other suburban/municipal accounts. Does not include groundwater at Sunol and Castlewood. Demands are based on average use from 2000-2010.
[6] City irrigation at Golden Gate Park, Great Highway Median, and SF Zoo.

4.3 Program Water Savings

Water savings for single family, multi family, and non residential conservation programs are summarized in Tables 23 thru 25. The values shown in these tables are net of expected savings from state/federal plumbing codes and building standards. They are the savings directly attributable to SFPUC retail conservation programs. As noted earlier, conservation programs are assumed to operate through 2035 with the exception of single-family toilet programs, non-residential toilet and urinal programs, and single-family washer rebate programs, which end earlier because full market penetration is realized.

Table 23
Single Family Retail Conservation Program Water Savings
(AF/Yr)

Program Category		2005	2010	2015	2020	2025	2030	2035
RSF-1	Clothes Washer Rebates	0	417	917	1,078	1,141	1,158	983
RSF-2	HET Rebates/Direct Install/ROR	0	227	737	1,052	1,206	975	795
RSF-5	Home Water Surveys	0	2	7	7	7	7	7
RSF-6	Showerhead Distribution/Direct Install	0	40	95	149	202	253	307
Total Savings		0	687	1,756	2,285	2,555	2,393	2,092
% of Adjusted Baseline Demand		0.0%	3.3%	8.8%	11.9%	13.8%	13.3%	11.8%

Table 24
Multi Family Retail Conservation Program Water Savings
(AF/Yr)

Program Category		2005	2010	2015	2020	2025	2030	2035
RSF-1	Clothes Washer Rebates	0	4	685	977	1,118	1,185	1,226
RSF-2	HET Rebates/Direct Install/ROR	0	179	571	835	1,003	1,100	1,153
RSF-5	Home Water Surveys	0	0	5	5	5	5	5
RSF-6	Showerhead Distribution/Direct Install	0	5	31	56	80	104	129
Total Savings		0	189	1,292	1,873	2,205	2,394	2,513
% of Adjusted Baseline Demand		0.0%	0.6%	*4.0%*	*5.9%*	*7.0%*	*7.6%*	*7.8%*

Table 25
Non Residential Retail Conservation Program Water Savings
(AF/Yr)

Program Category		2005	2010	2015	2020	2025	2030	2035
NR-1	Landscape Audits	0	17	84	84	84	84	84
NR-3	Landscape Grants	0	58	203	290	290	290	290
NR-4	CII Water Audits	0	141	287	292	297	302	307
NR-5	Urinal Rebates	0	10	64	98	122	140	145
NR-6	HET Rebates	0	176	406	574	709	701	601
NR-7	Innovative Retrofit Incentives	0	0	82	165	247	330	412
NR-11	Hospital Audits	2	0	0	0	0	0	0
NR-12	Coin-Op Clothes Washer Rebates	21	391	400	343	301	271	252
NR-13	School Audits	0	2	0	0	0	0	0
NR-19	Pre-Rinse Spray Valves	10	10	20	30	40	50	60
NR-21a	City/PUC Landscape Grants	1	0	0	0	0	0	0
Total Savings		35	805	1,547	1,876	2,091	2,168	2,152
% of Adjusted Baseline Demand		0.1%	3.0%	5.6%	6.6%	7.1%	7.0%	6.7%

4.4 Program Unit Cost of Water Savings

The present value of SFPUC retail conservation program expenditures and the unit costs of program water savings are summarized in Table 26. Present value and unit cost calculations assume a nominal discount rate of 5% and a long-term inflation rate of 3%.

The updated model uses two alternative methods for calculating unit cost of water savings. The first method, which follows the original model, divides the present value of program costs by cumulative water savings. This method understates the actual unit cost of water savings. It was included in the model update and is shown in Table 24 to provide continuity with the original model. The second method, which provides an accurate estimate of the cost of program water savings, divides the present value of program costs by the discounted cumulative water savings. This is equivalent to dividing the annualized cost of a program by its annualized water savings (see Attachment 1), which is how SFPUC calculates unit costs for other water supply investments. The discussion of unit costs that follows is based on the latter method for calculating unit cost.

The average unit cost of water savings across all programs is $860/AF. Unit costs for single family programs average $1,009/AF. Unit costs for multi family programs average $609/AF. Unit costs for non-residential programs average $952/AF.

Unit costs are not calculated directly for public information and residential survey programs. These programs generate water savings primarily in conjunction with the other conservation programs, particularly plumbing fixture replacement programs, and the water savings are captured primarily through these programs. Costs for public information and residential survey programs, however, are incorporated into the average unit costs for single- and multi-family programs. This is why the average unit cost for single-family programs exceeds the highest unit cost of single-family programs listed in Table 26.

Table 26
Estimated Program Unit Costs by Customer Class[1]

ID	Program Name	Cum. Savings (Thou. AF)	SFPUC PV Cost (Thou. $)	PV/ Savings[2] ($/AF)	Unit Cost[3] ($/AF)
Single Family Programs					
RSF-1	Washer Rebates	26.7	$10,433	$391	$498
RSF-2	HET Rebates/Direct Install/ROR	35.5	$22,084	$622	$911
RSF-3	Public Information[4]	N/A	$3,411	N/A	N/A
RSF-5	Residential Surveys[5]	0.2	$11,963	N/A	N/A
RSF-6	Showerhead Replacement	4.6	$1,291	$282	$378
RSF - Total[6]		**66.9**	**$49,182**	**$735**	**$1,009**
Multi Family Programs					
ID	Program Name	Cum. Savings (Thou. AF)	SFPUC PV Cost (Thou. $)	PV/ Savings[1] ($/AF)	Unit Cost[2] ($/AF)
RMF-1	Washer Rebates	24.0	$1,045	$44	$58
RMF-2	HET Rebates/Direct Install/ROR	40.1	$23,486	$586	$911
RMF-5	Residential Surveys[7]	0.1	$2,428	N/A	N/A
RMF-6	Showerhead Replacement	1.8	$620	$353	$482
RMF - Total[8]		**66.0**	**$27,579**	**$418**	**$609**
Non-Residential Programs					
ID	Program Name	Cum. Savings (Thou. AF)	SFPUC PV Cost (Thou. $)	PV/ Savings[1] ($/AF)	Unit Cost[2] ($/AF)
NR-1	Landscape-Audits	2.0	$1,933	$956	$1,228
NR-3	Landscape-Grants	6.5	$24,272	$3,715	$4,826
NR-4a	SFPUC Staff Water Audits	3.0	$1,155	$387	$464
NR-4b	Consultant Water Audits	4.9	$1,487	$301	$384
NR-5	CII Urinal Rebates	4.8	$1,799	$377	$588
NR-6	HET Rebates/Direct Install	24.0	$8,041	$335	$501
NR-7	Large Innovative Retrofit Incentives	5.4	$3,051	$569	$784
NR-11	Audits-Hospitals	0.0	$4	$756	$693
NR-12	Coin-Op Washer Rebates	9.2	$239	$26	$31
NR-13	Audits-Schools/Universities	0.0	$24	$6,083	$6,141
NR-19	Low Flow Sprayers-Restaurants	1.0	$209	$220	$289
NR-21a	City/PUC Landscape	0.0	$2	$864	$792
NR - Total		**51.6**	**$42,217**	**$819**	**$952**
All Programs		**193.7**	**$118,978**	**$614**	**$860**

[1]Cumulative savings, present value cost, and unit costs inclusive of historical program activity occurring between 2005 and 2010 and projected activity occurring between 2010 and 2035.
[2]Present value of program costs divided by cumulative program water savings.
[3]Annualized program costs divided by annualized program water savings.
[4]Savings from public information assumed to be included in savings estimates of other programs.
[5]Single-family surveys support plumbing fixture rebate programs. Savings mostly counted in those programs.
[6]Unit cost for combined single-family programs incorporates costs for public information and single-family surveys.
[7]Multi-family surveys support plumbing fixture rebate programs. Savings mostly counted in those programs.
[8]Unit cost for combined multi-family programs incorporates costs for multi-family surveys.

4.5 Annual Program Expenditure

Projected annual program expenditures for the period 2011 to 2035 are summarized in Table 27. Expenditures are listed in nominal dollars and assume program costs escalate at 3% per year. The drop in program expenditures starting in 2026 reflects the discontinuation of single-family and non-residential toilet replacement programs, which reach full market penetration in 2025.

Table 27
Projected SFPUC Conservation Program Expenditures: 2011-2035[1]
($000, nominal dollars[2])

	Residential			
Year	Single Family	Multi Family	Non-Residential	Total
2011	$2,525	$1,428	$2,095	$6,047
2012	$2,557	$1,428	$2,151	$6,136
2013	$2,635	$1,472	$2,203	$6,311
2014	$2,716	$1,517	$2,263	$6,496
2015	$2,799	$1,564	$2,324	$6,687
2016	$2,885	$1,612	$2,387	$6,884
2017	$2,973	$1,662	$2,453	$7,088
2018	$3,065	$1,713	$2,520	$7,298
2019	$3,159	$1,766	$2,590	$7,514
2020	$3,256	$1,820	$2,662	$7,737
2021	$3,356	$1,876	$2,736	$7,968
2022	$3,459	$1,934	$2,812	$8,205
2023	$3,565	$1,994	$2,891	$8,450
2024	$3,675	$2,055	$2,973	$8,703
2025	$2,983	$2,119	$3,057	$8,158
2026	$1,305	$2,184	$3,144	$6,632
2027	$1,347	$2,251	$3,233	$6,831
2028	$1,390	$2,321	$2,725	$6,436
2029	$1,435	$2,392	$2,802	$6,630
2030	$1,481	$2,466	$2,882	$6,829
2031	$1,430	$2,542	$2,964	$6,936
2032	$1,476	$2,620	$2,856	$6,952
2033	$1,524	$2,700	$2,937	$7,162
2034	$1,573	$2,783	$2,830	$7,187
2035	$1,624	$2,869	$2,912	$7,405

[1]Draft program plan as of 01-05-2011.
[2]Program costs escalated at 3% per year.

Attachment 1

SFPUC Retail Demand Model Unit Cost Derivation

This attachment shows the mathematical derivation of unit cost used in the model and provides a simple example illustrating it.

Define the following variables:

Y_t = program yield (e.g. savings) in year t

C_t = program cost in year t

T = program cost recovery period

r = cost of capital

U = Unit cost of project yield

To fully recover the present value of the program, the unit cost of program yield U must satisfy the following equation:

(1) $$\sum_{t=1}^{T} \frac{C_t}{(1+r)^t} = \sum_{t=1}^{T} \frac{UY_t}{(1+r)^t}$$

Because U is constant, equation (1) can be rearranged and solved for U:

(2) $$U = \frac{\sum_{t=1}^{T} \frac{C_t}{(1+r)^T}}{\sum_{t=1}^{T} \frac{Y_t}{(1+r)^T}}$$

Let PV_C equal the present value cost of the program (i.e. the numerator in equation 2). Let C be the annualized cost of the program, which is given by:

(3) $$C = PV_C \left[\frac{r}{\left(1 - \frac{1}{(1+r)^T}\right)} \right]$$

Similary, let PV_Y equal the present value yield of the program (i.e. the denominator in equation 2). The annualized yield of the program, Y, is:

(4) $$Y = PV_Y \left[\frac{r}{\left(1 - \frac{1}{(1+r)^T}\right)} \right]$$

Dividing equation (3) by equation (4) gives:

(5) $$\frac{C}{Y} = \frac{PV_C \left[\frac{r}{\left(1 - \frac{1}{(1+r)^T}\right)} \right]}{PV_Y \left[\frac{r}{\left(1 - \frac{1}{(1+r)^T}\right)} \right]} = \frac{PV_C}{PV_Y} = \frac{\sum_{t=1}^{T} \frac{C_t}{(1+r)^T}}{\sum_{t=1}^{T} \frac{Y_t}{(1+r)^T}} = U$$

Equation (5) and equation (2) show that calculating unit cost by dividing the annualized cost of the program by the annualized yield is mathematically equivalent to dividing the present value cost of the program by the present value yield of the program. Both formulations result in the unit cost that will fully recover the present value cost of the program.

Unit Cost Calculation Example

The following simple example illustrates the unit cost calculation and demonstrates that it results in a unit cost that fully recovers the present value cost of the conservation measure. For this example, it is assumed that the real cost of capital (i.e. the project discount rate) is 3%.

Assume a conservation program to replace toilets has a per toilet cost of $400. This program incurs this cost in the year a toilet is replaced. Replaced toilets save, on average, 13,000 gallons of water per year. However, over time these toilets eventually would have been replaced by the plumbing code. Past studies have indicated that roughly 4% of the existing stock of non-efficient toilets is replaced each year with efficient toilets because of the plumbing code. This effectively means that the water savings attributed to the program decays at a rate of 4% per year. The following table shows the projected costs and water savings over 30 years from replacing one toilet. In the year the toilet is installed only half the annual water savings are

counted because the month the toilet was replaced is assumed to be unknown. Therefore, the mid-point of the year is used.

In the following table, the present value of annual program cost is calculated in column (5) and the present value of annual saved water is calculated in column (6). The sum of column (5) divided by the sum of column (6) yields the unit cost, per equation (2).

Column (7) is the product of column (4) – annual saved water – and the calculated unit cost. Column (8) is the present value of column (7). The sum of column (8) is exactly $400, thus showing that the calculated unit cost fully recovers the present value cost of the program.

Example Unit Cost Calculation

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year	Toilets Replaced	Program Cost	Water Saved (af/yr)	Pres. Val. Col (3)	Pres. Val. Col (4)	Col (4) X Unit Cost	Pres. Val. Col (7)
0	1	$400	0.0230	$400.00	0.0230	$18.27	$18.27
1			0.0383	$0.00	0.0372	$30.40	$29.52
2			0.0368	$0.00	0.0347	$29.19	$27.51
3			0.0353	$0.00	0.0323	$28.02	$25.64
4			0.0339	$0.00	0.0301	$26.90	$23.90
5			0.0325	$0.00	0.0281	$25.82	$22.27
6			0.0312	$0.00	0.0262	$24.79	$20.76
7			0.0300	$0.00	0.0244	$23.80	$19.35
8			0.0288	$0.00	0.0227	$22.85	$18.03
9			0.0276	$0.00	0.0212	$21.93	$16.81
10			0.0265	$0.00	0.0197	$21.05	$15.67
11			0.0255	$0.00	0.0184	$20.21	$14.60
12			0.0244	$0.00	0.0171	$19.40	$13.61
13			0.0235	$0.00	0.0160	$18.63	$12.68
14			0.0225	$0.00	0.0149	$17.88	$11.82
15			0.0216	$0.00	0.0139	$17.17	$11.02
16			0.0208	$0.00	0.0129	$16.48	$10.27
17			0.0199	$0.00	0.0121	$15.82	$9.57
18			0.0191	$0.00	0.0112	$15.19	$8.92
19			0.0184	$0.00	0.0105	$14.58	$8.32
20			0.0176	$0.00	0.0098	$14.00	$7.75
21			0.0169	$0.00	0.0091	$13.44	$7.22
22			0.0163	$0.00	0.0085	$12.90	$6.73
23			0.0156	$0.00	0.0079	$12.38	$6.27
24			0.0150	$0.00	0.0074	$11.89	$5.85
25			0.0144	$0.00	0.0069	$11.41	$5.45
26			0.0138	$0.00	0.0064	$10.96	$5.08
27			0.0133	$0.00	0.0060	$10.52	$4.74
28			0.0127	$0.00	0.0056	$10.10	$4.41
29			0.0122	$0.00	0.0052	$9.69	$4.11
30			0.0117	$0.00	0.0048	$9.31	$3.83
			Sum:	**$400.00**	**0.5039**		**$400.00**
			Unit Cost ($/AF):	**$793.78**			

Attachment 2

Original SFPUC Retail Demand Model

Double Counting of Water Losses Due to Meter Under-Registration

This attachment explains how the original retail demand model double counted meter under-registration in the demand projections.

- Total in-city retail water production is the sum of in-city retail demands and in-city system losses.
- Under the original model specification, in-city retail demands are the sum of water end uses in the single-family, multi-family, and non-residential customer segments.
- The sum of these end uses, in turn, is equal to metered water sales plus unregistered water delivery due to meter under-registration error.
- Under the original model specification, system losses are equal to physical water losses due to leaks, breaks, fire flow, and system flushing plus unregistered water delivery due to meter under-registration error.
- Thus the original model specification, which sums in-city retail demands and system losses, double counts water losses due to meter under-registration error.
- SFPUC estimates total system losses of 9.0%, of which roughly 2.1% are attributed to meter under-registration error. Thus, under the original model specification, approximately 23% (2.1/9.0) of the system loss estimate is already counted within the retail demand estimate.

The following equations demonstrate this algebraically.

Define the following variables:

T = total in-city retail water production, including system losses

R = in-city retail demands

L_T = in-city system losses, including losses due to meter under-registration

L_M = in-city system losses due to meter under-registration

L_O = in-city system losses from other sources

S = metered retail sales

E = end uses of water by retail customers

Under the original model specification, total in-city retail water production, including system losses are defined as in equation (1):

(1) $T = R + L_T = R + L_M + L_O$

The original model specification defines in-city retail demands as in equation (2):

(2) $R = E$

End uses of water by retail customers, E, must equal metered retail sales plus losses due to meter under-registration, as in equation (3):

(3) $E = S + L_M$

Substituting equation (3) into (2) and (2) into (1) gives:

(4) $T = S + 2L_M + L_O$

Appendix E

Summary of San Francisco's Response to 1987-92 Drought Experience

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Summary of San Francisco's Response to 1987-92 Drought Experience

Background:

The 1987-92 six year drought provides an example of how the near-term drought management process works in times when the operational capabilities of Hetch Hetchy and other water supplies available to the SFPUC are taxed to a point that forces drastic actions to avoid running out of water. By the sixth year of that drought period, many of the programs and actions identified in San Francisco's current Retail Water Shortage Allocation Plan (adopted in December 2001) had been implemented. The following describes some of the major actions that occurred.

Demand Reductions:

The extended drought forced San Francisco to adopt a mandatory rationing program, enforced by stiff excess use charges and the threat of shut-off for continued violations of water use prohibitions. Mandatory rationing was in effect May of 1988 through May of 1989, re-instituted in May of 1990, and continued until March of 1993. A Water Shortage Emergency Resolution was passed by the SFPUC on April 28, 1988 declaring these rationing periods (Resolution No. 88-0155). A copy of this resolution can be found at the end of this appendix.

The SFPUC's water rationing program was one of the toughest in the state and the most stringent imposed by any major urban water supply agency. Although the specifics of the program varied over time, the basic outline of the mandatory rationing program was to achieve a 25 percent reduction to 1987 (pre-drought) consumption (system-wide), with water allocations set on an account-by-account basis.

To provide a strong incentive for customers to use no more water than their allotment, the SFPUC adopted a rate structure that incorporated excess use charges. Any customer that used less water than its allotment was charged the normal rate per unit of water consumption, while any customer who used more than its allotment was charged a multiple of the normal rate for every unit of consumption above its allotment. As of January 1, 1992 (the last year of the rationing program), the rate structure shown in the table below applied to SFPUC customers.

Excess Use Charges	
If Water Consumption Is (Over Allotment)	Excess Use Charge Will Be (Times Normal Rate)
Up to 10%	2
10.01 - 20%	8
20.01% or over	10

In the event that water was used in excess of the customer's specified allotment, the SFPUC could, after one written warning, install a flow restrictor on the customer's service line. The charge to install and remove the restricting device is shown in the table below. If a customer continued to consume water in excess of its allotment, the SFPUC had the authority to discontinue the customer's water service and require the customer to bear the cost for the re-connection of water service.

Fee For Installing Flow Restricting Devices	
Meter Size	Installation/Removal Cost
to 1"	$95
1" to 2"	$149
3" and larger	Actual cost

In addition to pricing disincentives for excess water use, numerous water use restrictions were adopted and enforced. San Francisco retail customers were required to comply with the following water use prohibitions and restrictions:

- Water waste, including but not limited to, any flooding or runoff into the street or gutters, was prohibited.
- Hoses could not be used to clean sidewalks, driveways, patios, plazas, homes, businesses, parking lots, roofs, awnings or other hard surfaces areas.
- Hoses used for any purpose had to have positive shutoff valves.
- Restaurants served water to customers only upon request.
- Potable water was not to be used to clean, fill or maintain levels in decorative fountains.
- Use of additional water was not allowed for new landscaping or expansion of existing facilities unless low water use landscaping designs and irrigation systems were employed.
- Water service connections for new construction were granted only if water saving fixtures or devices were incorporated into the plumbing system.
- Use of potable water for consolidation of backfill, dust control or other non-essential construction purposes was prohibited.
- Irrigation of lawns, play fields, parks, golf courses, cemeteries, and landscaping of any type with potable water would be reduced by at least the amount specified for outside use in the adopted rationing plan.
- Verified water waste as determined by the Water Department would serve as prima facie evidence that the allocation assigned to the water account is excessive; therefore, the allocation was subject to review and possible reduction, including termination of service.
- Water used for all cooling purposes was to be recycled.
- The use of groundwater and/or reclaimed water for irrigation of golf courses, median strips, and similar turf areas was strongly encouraged.
- The use of groundwater and/or reclaimed water for street sweepers/washers was strongly encouraged.

In addition to water use prohibitions and directives specifically responsive to the drought, the SFPUC coincidentally was implementing long-term conservation programs, which also lowered water demands during the drought period (refer to the Demand Management discussion). Following the drought, several of the measures described above were adopted by San Francisco into permanent, on-going programs.

Water Management:

In addition to effecting reductions to water demands, the SFPUC also employed water management activities to control the severity of water shortages to its customers.

During the drought and for the first time in history, the SFPUC utilized a Delta supply within its system. The SFPUC imported water from the Delta through use of State Water Project South Bay Aqueduct facilities. The sources of water transferred included transfers via the California Emergency Water Bank, Placer County and the Modesto Irrigation District. The waters were diverted from the South Bay Aqueduct into the SFPUC's San Antonio Reservoir and then treated and integrated into SFPUC's water distribution system.

The amount of water actually delivered to the SFPUC was constrained due to numerous factors including the lack of willing sellers, allocation procedures, lack of priority in use of the State transmission facilities, storage constraints in San Antonio Reservoir, and water treatment constraints within the SFPUC's system. The total water that was imported into the SFPUC's system amounted to a maximum of approximately 31,000 acre-feet in one year, and in total for the drought period amounted to 59,000 acre-feet.

The importation of additional water into the SFPUC's system allowed the continuation of a 25 percent system-wide rationing program as compared to a potentially higher level of rationing had the transfers not occurred.

System Response and Effects:

The system-wide goal of reducing water use by 25 percent was achieved. However, the reduction was not accomplished without cost or hardship.

To achieve its annual 25 percent system-wide rationing goal, the SFPUC targeted a reduction of indoor consumption by 10 percent and outdoor consumption by 60 percent.

Due to the nature of the allocation formula for water allotments and the level of system-wide reduction goals, instances occurred where individual users or wholesale water customers were burdened with up to twice the system-wide average in delivery reductions.

Some of the costs incurred by individuals, property owners and renters include:

- The cost of installing low-flow toilets, retrofit kits for toilets and showerheads, and special low-water use landscaping and irrigation systems
- The financial losses resulting from loss of lawns, plants and trees due to the 60 percent reduction in water available for irrigation
- The cost of excess use charges ($12,300,000 in excess use charges was billed to retail accounts in fiscal year 1991-92 alone)

The ability of SFPUC's retail customers to achieve a 25 percent reduction in the future is highly unlikely due to the "hardening" of water demands that occurred during and subsequent to the drought. The rationing programs implemented by San Francisco during the 1987-92 drought were measured by comparison to calendar year 1987 water deliveries, i.e., pre-drought conditions.

During the 1987-92 drought San Francisco's retail and wholesale water customers implemented numerous conservation measures that have led to permanent per capita water usage savings. San Francisco's current

water demand is likely hardened as compared to the 1987 level of water demand. This situation leads to a conclusion that comparable rationing goals (e.g., up to 25 percent reduction) would be more difficult to achieve since the drought, and would require measures in excess of those implemented during the 1987-92 drought to achieve a comparable percentage of delivery reduction.

As the level of rationing increases, the economic and societal impacts become more severe. The SFPUC has first hand experience in attempting to employ rationing to levels, which are intolerable to citizens and businesses.

In 1991, water storage had deteriorated and the SFPUC was forced to immediately adopt a 45 percent system-wide rationing plan. It was proposed the reduction would be achieved through a 33 percent reduction to inside water use and a 90 percent reduction to outside water use.

San Francisco's plan for meeting its rationing goal included the following minimum and maximum criteria:

- *Maximum Allocation for Single and Multi-family Residences.* No single-family residence shall receive an allocation of more than 300 gallons per day; no multi-family residence shall receive an allocation of more than 150 gallons per day times the number of living units in the building.

- *Minimum Allocation for All Residential Accounts.* A minimum of 50 gallons per day per documented resident will be allowed. However, a minimum allocation will not be approved to increase an allocation above current usage absent a documented change in circumstances.

- *Irrigation Services.* Accounts classified for irrigation only will be reduced by 90 percent.

- *Commercial/Industrial Allocations.* Commercial and industrial allocations will be reduced by 32 percent. Hospitals and other health care facilities may be subject to lesser restrictions subject to verification that all conservation measures are in place; such approval shall require an on-site conservation inspection.

- *Allocations for New Accounts.* Initial allocations will be established at 50 gallons per day. These allocations will be re-evaluated after customers have installed retrofit kits provided by the San Francisco Water Department. After verification of installation, allocations will be calculated on the basis of the number of documented residents within a household, or, in the case of commercial or industrial customers, on the basis of business data supplied to the Department.

Additional water use restrictions and prohibitions were enforced:

- The washing of all automobiles, motorcycles, RVS, trucks, transit vehicles, trailers, boats, trains and airplanes was prohibited outside of a commercial washing facility.

- Exceptions to the above use restriction were windows on all vehicles and such commercial or safety vehicles requiring cleaning for health and safety reasons.

- Water used for all cooling purposes or for commercial car washes had to be recycled.

- The use of potable water on golf courses was limited to the irrigation of putting greens. The use of groundwater and reclaimed water was permitted when approved by the Department of Health.

- The filling of new swimming pools, spas, hot tubs or the draining and refilling of existing pools, etc., was prohibited; topping off was allowed to the extent that the designated allocation was not exceeded.
- The irrigation of median strips with potable water was prohibited. The use of groundwater and reclaimed water was permitted when approved by the Department of Health.
- The use of potable water for street sweepers/washers was prohibited. The use of groundwater and reclaimed water was permitted when approved by the Department of Health.

Public and commercial response to 45 percent rationing was overwhelmingly negative. During the first weeks after notification of the program, SFPUC received over 2,000 appeal letters per day. In the month before rationing was returned to 25 percent, 19,000 appeals, 12,000 telephone calls, and 1,500 walk-in complaints occurred.

Both the allocation levels and new prohibitions required to meet this level of rationing would have had a devastating effect on commercial enterprises. Some water uses would have simply been prohibited. Simply put, rationing had been taken to a level that was considered intolerable to citizens and had become economically disastrous.

RESOLUTION No. 88-0155

WHEREAS, The San Francisco Water Department obtains water from the reservoirs operated by the Hetch Hetchy Water and Power and from local Bay Area reservoirs; and

WHEREAS, Due to critically low supplies of water within the reservoirs and anticipated low levels of inflow into the reservoirs, such that unless consumption is decreased there may be insufficient water supplies for human consumption, sanitation and fire protection; and

WHEREAS, Decreases in water consumption may be accomplished by reducing allocations to the Water Department's wholesale customers and by imposing water use restrictions on the Water Department's retail customers, as set forth in the Water Rationing Rules and Regulations, issued on April 21, 1988 and attached hereto as Water Rationing Rules and Regulations; and

WHEREAS, This Commission recognizes the need to declare a Water Shortage Emergency (Water Code Sec. 350, et. seq.) due to critically low water supplies now available, and the need for a reduction in water use by the San Francisco Water Department's Suburban Wholesale Customers; and

WHEREAS, This Commission recognizes the need to adopt a Water Conservation Program (Water Code Sec. 375, et. seq.) due to the critically low water supplies now available, and the need for a reduction in water use by the San Francisco Water Department's retail customers; and

WHEREAS, The City of San Jose is, by Resolution 85-0256, a temporary and interruptible wholesale customer of the Water Department, and the Settlement Agreement and Master Water Sales Contract between the City and County of San Francisco and certain Suburban Purchasers in San Mateo County, Santa Clara County and Alameda County (Settlement Agreement) requires action by the Commission to interrupt service to the City of San Jose (Section 8.17); and

WHEREAS, The City of Santa Clara is, by Resolution 85-0257, a temporary and interruptible wholesale customer of the Water Department, and the Settlement Agreement requires action by the Commission to interrupt service to the City of Santa Clara (Section 8.17); and

WHEREAS, Additional funding in the amount of $648,780 for FY 1988/89 has been identified by the Water Department for implementation of a mandatory water rationing program; and

WHEREAS, on April 21, 1988, the Water Department submitted to this Commission a Water Conservation Program; and

WHEREAS, The Conservation Program shall cease to exist in whole or in part at such time as the Commission finds that the supply of water available to the Water Department's service area has been replenished or augmented so that there are sufficient supplies to meet the needs of the Water Department's customers without the continued implementation of these measures; and

VOTE

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of APRIL 22 1988

Dorothea A. Baldridge
Secretary, Public Utilities Commission

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

RESOLUTION No. 88-0153

WHEREAS, The recommended Water Conservation Program has received wide-spread public distribution; and

WHEREAS, Members of the public have been given an opportunity to, and have expressed their views on the recommended Water Conservation Program in a public hearing; now, therefore be it

RESOLVED, That this Commission declares a Water Shortage Emergency; and

BE IT FURTHER RESOLVED, That this Commission adopts a Water Conservation Program; and

BE IT FURTHER RESOLVED, That this Commission approves the Water Conservation Program dated April 21, 1988 as amended April 28, 1988, and directs that it be placed in force on May 1, 1988; and

BE IT FURTHER RESOLVED, That it is not the Commission's intention to interrupt water service to the cities of San Jose and/or Santa Clara; however, pursuant to its obligation under the Settlement Agreement and Master Water Sales Contract this Commission authorizes the General Manager of the Water Department to interrupt water service to the cities of San Jose and/or Santa Clara if necessary to achieve the required water saving, however, prior to actual interruption of service to either the City of San Jose or Santa Clara, the General Manager of the Water Department shall report to the Commission the need for interruption and receive affirmation from the Commission prior to institution of the interruption; and the Commission further directs the General Manager of the Water Department to mitigate the effect of the interruptions to the extent possible and consistent with the needs of San Francisco's permanent customers; and

BE IT FURTHER RESOLVED, That this Commission hereby authorizes the additional budget needs to be added to the Water Department's Conservation Programmatic Budget, thus amending the Water Department's budget request for FY 1988/89; and

BE IT FURTHER RESOLVED, That this Commission hereby designates Tuesday, May 24, 1988 as the date for a public hearing by the Public Utilities Commission for considering proposals for rate increases and additional charges for water service and water supplied by the San Francisco Water Department to retail customers; and

BE IT FURTHER RESOLVED, That this Commission hereby designates Tuesday, May 24, 1988 as the date for a public hearing by the Public Utilities Commission for considering proposals for rate structure adjustments for water service and water supplied by the San Francisco Water Department to wholesale customers; and

BE IT FURTHER RESOLVED, That the revenue requirements and an analysis of the rate increases, rate structure adjustments and additional charges be made available for public inspection and review beginning Monday, May 16, 1988 in Room 287, City Hall, San Francisco.

0019f

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of APRIL 28 1988

Dorothy A. Baldridge
Secretary, Public Utilities Commission

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Appendix F

Retail Water Shortage Allocation Plan

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RETAIL WATER SHORTAGE ALLOCATION PLAN

December 11, 2001

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I. Introduction

A. Purpose and Need for Retail Water Shortage Allocation Plan

The intent of the Retail Water Shortage Allocation Plan (Plan) is to provide the San Francisco Public Utilities Commission (SFPUC) with a guidance tool to be used for allocating water amongst the City and County San Francisco retail customers ("retail customers") in the event of a water shortage due to drought. Additionally, the Plan provides retail customers with a framework for understanding how the SFPUC intends to allocate water resources during times of water shortage due to drought. The expectation is that this Plan can help retail customers better anticipate how their individual water supply will be affected during a drought.

The need for this Plan has come about as a result of a series of actions and experiences including the SFPUC's adoption of the Interim Water Shortage Allocation Plan and the drought of 1987-1992. At the time of the 1987-1992 drought, the SFPUC, in the absence of a drought plan, reacted to the drought by adopting a short-term approach for allocating water resources amongst both retail and wholesale customers. This Plan in combination with the Interim Water Shortage Allocation Plan puts in place a long-term plan for responding to levels of water shortage due drought. The following sections describe these actions and experiences in more detail.

1. Interim Water Shortage Allocation Plan

In October 2000, the SFPUC adopted an Interim Water Shortage Allocation Plan (IWSAP) that provides a method and process by which the SFPUC intends to allocate water resources between its collective retail customers and wholesale customers during system-wide water shortages of up to 20 percent resulting from drought. The IWSAP was subsequently adopted by all 29 wholesale customers between October 2000 and June 2001 thereby officially activating the allocation method and process outlined in the IWASP.

The allocation method adopted in the IWSAP relies on a percentage decrease of inside and outside water use and provides a notification schedule for informing customers of an upcoming drought. The IWSAP also outlines a structure for water transfers between the retail and wholesale customers. Finally, the IWSAP identifies an enforcement process for ensuring that the allocations are adhered to through the application of excess use charges.

This Retail Plan is consistent with the IWSAP in its methodology, schedule and enforcement process.

2. Past Drought Experience

The SFPUC, along with the entire State of California, experienced a significant drought from 1987 to 1992. During this time the SFPUC experienced system-wide shortages of 25 to nearly 45 percent. In response to the drought, the SFPUC instituted mandatory rationing which required retail customers to reduce indoor and outdoor consumption based on specified allocations for those use types. As the drought progressed, SFPUC

retail customers were required to reduce total consumption by 14 percent, up to approximately 32 percent. If customers consumed beyond their allotted amount they were faced with excess use charges. For the most part, customers were able to reduce their indoor use through installation of water-conserving devices such as low-flow toilets, showerheads and faucet aerators.

The Customer Service Bureau of the SFPUC created a short-term rationing unit to implement the drought program. The rationing unit's primary responsibility was to enforce mandatory rationing and manage the allocation and appeal process. Throughout the drought, the rationing unit received 131,000 requests for modified allocations. In general, allocations were modified on the basis of increased occupancy, medical exemptions, allowances for past conservation, increased business, and other miscellaneous reasons. Modifications were based on a per capita allotment.

The rationing unit also performed audits on those customers who consumed water beyond their allocations. This was done in an effort to identify the presence of leaks or other system failures that resulted in excess use.

B. Long-term Conservation Programs and Existing Demand Reduction Policies/Ordinances

1. Long-term Conservation Programs

In 1986, prior to the 1987-1992 drought, the SFPUC established a long-term conservation program. A conservation administrator was hired to implement the program. The programs, at that time, included public information and education; a conservation device retrofit program; landscape water audit program; and a low-use landscaping program. During the drought the long-term conservation program continued.

In 1991, the SFPUC elevated its long-term conservation program when it became a signatory to the *Memorandum of Understanding Regarding Urban Water Conservation in California.* This MOU outlined water-conserving Best Management Practices (BMPs) that all signatories agreed to implement. Today's BMPs include:

- Interior and Exterior Water Audits and Incentive for Single Family Residential and Multi-family Residential Customers
- Residential Plumbing Retrofit
- System Water Audits, Leak Detection and Repair
- Metering with Commodity rates for all New Connections and Retrofit of Existing Connections
- Large Landscape Conservation Programs and Incentives
- Horizontal Axis Washer Rebate Programs
- Public Information
- School Education Programs
- Commercial, Industrial and Institutional Water Conservation
- Wholesale Agency Assistance Programs
- Conservation Pricing
- Conservation Coordinator
- Water Waste Prohibition

- Residential Ultra Low Flush Toilet Replacement Programs

Through the implementation of the long-term conservation program, the SFPUC retail residential customers have reduced their per capita per day (pcpd) demand by 12 gallons. That is, prior to the 1987-1992 drought per capita residential demand was at 73 gallons per capita per day (gpcpd) while current demand is at 61 gpcd. Approximately 95 percent of SFPUC retail customers have signed affidavits confirming that they have installed water-conserving devices in their homes to eliminate water waste. Such devices include low flush toilets, faucet aerators and low flow showerheads.

2. Existing Demand Reduction Policies/Ordinances

In addition to the long-term conservation programs in place, the SFPUC and Board of Supervisors have implemented several demand reduction policies and ordinances that encourage the reduction of potable water use. These policies and ordinances range from requiring installation of conservation devices at the time of residential resale to development of groundwater and recycled water sources. The following summarizes measures adopted through 2001.

Water Conservation Ordinances

Ordinance 392-90: Water Conservation Fixtures in New and Renovated Buildings[1]. This ordinance changed San Francisco plumbing codes to require all new buildings (and all buildings in which the water drainage system is substantially altered modified or renovated) to install/retrofit toilets and urinals with fixtures using no more than 1.6 gallons per flush and 1 gallon per flush, respectively.

Ordinance 185-91 and *Ordinance 346-91: Plumbing Fixture Retrofit in Multi-family Residential Buildings and Single-Family Residential Buildings*[2]. Collectively these ordinances require water conservation device retrofits within multi-family and single-family residential buildings upon sale, transfer of title, or major improvement to a dwelling. The ordinance also required all applicable fixtures within multi-family residential units to be retrofitted within three years subsequent to the effective date of the ordinances (by the end of 1994).

Retrofit requirements include:

- Installation of Showerheads with a capacity not exceeding 2.5 gallons per minute;
- Installation of aerators attached to sinks and basins where possible; and
- Installation of flush reducers, flow restrictors, volume reducers, or toilets with a capacity not exceeding 3.5 gallons per flush.

Ordinance 359-91: Plumbing Fixture Retrofit of Commercial Buildings, including Tourist Hotels and Motels[3]. This ordinance required the same plumbing retrofit requirements for commercial buildings, including tourist hotels and motels as was required for single and multi-family residential buildings. Compliance of this ordinance was also required by 1994.

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[1] San Francisco Plumbing Code sections 905 and 1001.1
[2] San Francisco Housing Code, Chapter 12A, Section 12A01-12A14
[3] San Francisco Building Code, Chapter 53B, Sections 53B01-53B15

Ordinance 92-91(as amended by Ordinance 192-00): Water Use for Landscaping in New Developments[4]. This ordinance requires particular water-conserving landscape strategies be employed for any new commercial, governmental or residential (two or more units) building on a lot exceeding 3,500 square feet or with a landscaping area of more than 1,000 square feet. The specific requirements of the ordinance include:

- Total area devoted to turf grass; decorative water use and water intensive planting must be limited to 15% of the parcel area. The limitation does not apply to children's play areas, public recreation areas or other such areas;
- Strips of turf less than 8 feet wide are prohibited;
- Water intensive plants must be grouped together and must be irrigated on a separate cycle from turf grass;
- Slopes exceeding 10% adjacent to the hardscape cannot consist of turf grass;
- All large areas must have separately metered irrigation systems;
- Valves and circuits shall be separated based on water use and must be set to operate between 5 p.m. and 10 a.m.; and
- A soil analysis must be done on the soil used for the landscape. A report specifying how the soil deficiencies will be meet must accompany the application for the meter.

Ordinance 148-99: Plumbing Retrofit of Municipal Buildings[5]. This ordinance requires all municipal buildings to replace their water-inefficient toilets with 1.6 gallons per flush toilets and showerheads with 1.5 gallons per minute showerheads by June 6, 2005.

Recycled Water Ordinances

Ordinances 390-91 and *391-91(as amended by Ordinance 393-94): Mandatory Use of Reclaimed Water*[6]. These ordinances require the development of a Recycled Water Master Plan including the designation of recycled (or reclaimed) water use areas within San Francisco and requires the installation of dual plumbing systems within the recycled water use areas for the following situations:

- New or remodeled buildings and all subdivisions (except condominium conversions) with a total area of 40,000 square feet or more; and
- New and existing irrigated areas of 1,000 square feet or more.

Ordinance 175-91: Mandatory Use of Non-Potable Water for Soil Compaction and Dust Control[7]. This ordinance requires the use of non-potable water for soil compaction and dust control during construction and demolition projects.

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[4] San Francisco Administrative Code, Chapter 63, 63-63.11
[5] San Francisco Administrative Code, Chapter 82, Section 4.
[6] San Francisco Public Works Code, Article 22, Sections 1200-1210
[7] San Francisco Public Works Code, Article 21, Sections 1100-1107

Water Waste Prohibitions

The Customer Service Bureau currently enforces several water waste prohibitions through a complaint/inspection process. The following prohibitions are subject to that process:

- Water waste, including but not limited to, any flooding or runoff into the street or gutters is prohibited;
- Hoses used for any purpose must have positive shut-off valves;
- Restaurants shall serve water to customers only upon request; and
- Water used for all cooling purposes and commercial car washes must be recycled.

3. Relationship between Future Demand Reductions and Existing Long-term Conservation Programs

The SFPUC retail customers are facing a hardened demand as a result of long-term conservation programs and installation of water-conserving devices during the 1987-92 drought. As a result of these factors, residential demand has been reduced by 12 gallons per capita per day (gpcpd) since pre-drought demand levels. In addition, approximately 95 percent of residential customers have signed affidavits attesting to the fact that they have installed low-flush toilets, faucet aerators and low-flow showerheads. Furthermore, the SFPUC's consistent implementation of BMPs for water conservation, as identified above, has resulted in hardened demand for commercial, industrial and institutional customers.

This hardened demand means that reducing demand during future droughts will be challenging. As mentioned previously, during the 1987-92 drought there was an opportunity to reduce demand by installing low-flush toilets, faucet aerators and low-flow showerheads. That opportunity has been significantly reduced. This means that during the next drought demand reduction will most likely come from changing the frequency in which water-consuming devices are used. For example, reducing the number of times the toilet is flushed or running the washing machine less frequently.

Despite the challenge, there is a need for the SFPUC to adopt a plan to be implemented during droughts that will result in reducing water delivery from the SFPUC reservoir system. This includes adopting a water shortage allocation plan, the principal objective of this Retail Plan.

C. Components of the Plan

The Retail Plan consists of two primary sections: (1) Declaring a water shortage and (2) Allocation method and process. The former section describes the process for identifying and declaring a water shortage due to drought. The latter section describes the process of allocating water amongst retail customers during a drought, the process of appealing those allocations and enforcement of allocations.

II. Process for Declaring Shortage

A. Timing and Assessment of Water System Conditions

The SFPUC water supply system relies on precipitation and snowmelt stored in its reservoirs from one year to the next. It is this "carry-over" storage that the SFPUC relies on to be able to meet wholesale and retail demand. Because of the importance of "carry-over" storage, the water supply condition of the SFPUC system is constantly monitored and evaluated. Look-ahead forecasts are updated as a year's hydrology and operations change. Generally in early winter of any year, SFPUC staff can begin providing a forecast of water supply conditions for the upcoming year based on known and anticipated winter and spring precipitation and snowpack. The annual precipitation, snowmelt, and "carry-over" storage together constitute the SFPUC's reservoir storage condition. Using data for each of these factors, SFPUC staff is able to determine whether the reservoir system will be capable of serving full deliveries to the SFPUC customers.

Consistent with the Interim Water Shortage Allocation Plan, if the SFPUC reservoir system appears incapable of meeting system-wide demand due to drought, the SFPUC is expected to declare a water shortage by March 31 of that drought year. The General Manager, or designee, is responsible for declaring such a shortage.

B. Delivery Reduction Levels

To aid in balancing the SFPUC supplies with demands during drought, the SFPUC has developed a general protocol that links anticipated total[8] reservoir storage conditions to suggested delivery reductions. The SFPUC total reservoir system has the capacity to store up to 1,627,000 acre-feet. In relation to this storage capacity and a current system-wide demand of 260 million gallons per day (mgd), when it appears the total system storage will not reach above approximately 1,000,000 acre-feet at the end of the spring-summer snowmelt, the SFPUC may begin to evaluate whether the reservoir system will be capable of serving full deliveries to its customers.[9] If the reservoir system is determined incapable of serving full deliveries to SFPUC customers, the SFPUC may impose a level of delivery reduction. As anticipated reservoir storage becomes more depleted during drought, a greater level of delivery reduction may be required. There are three stages of water delivery reduction that correspond to the SFPUC protocol. The three stages are:

(1) Stage 1 – requires system-wide demand reduction of 5 to 10 percent. This stage results in a voluntary rationing request of customers. At this stage, it is likely that retail water customers will be alerted to the status of water supply conditions and reminded of water use prohibitions as well as informed of any incentives and programs available to reduce water demand (i.e. acceleration of long-term conservation programs such as toilet rebate programs, leak detection audits, and the like)

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[8] "total reservoir storage" includes all system reservoirs (Lloyd, Eleanor, Hetch Hetchy, San Anotonio, Calaveras, Crystal Springs, Pilarcitos, and San Andreas) and the water bank at New Don Pedro Reservoir.

[9] This reduction point is subject to change as total system-wide demand increases over time.

(2) Stage 2 – requires system-wide demand reduction of 11 to 20 percent. This stage results in mandatory rationing programs. In addition to implementing Stage 1 actions, all customers will receive an allocation of water. Any use beyond that allocation will become subject to excess use charges, installation of flow restrictor devices or shut-off of water. The latter two consequences may also be imposed if water waste prohibitions are violated.

(3) Stage 3 – requires system-wide demand reduction of 20 percent or greater. This stage results in mandatory rationing programs and results in the same actions identified under Stage 2 with further reduced allocations.

C. Initiation of Delivery Reduction Program

Prior to the initiation of any of water delivery reductions, whether it be initial implementation of reduced delivery or increasing the severity of water shortage, the SFPUC will outline the water supply situation, proposed water use reduction objectives, alternatives to water use reductions, methods to calculate water use allocations and adjustments, compliance methodology and enforcement measures, and budget considerations at a regularly scheduled Commission meeting for public input. The meeting will be advertised and the public will be invited to comment on the SFPUC's intent to reduce deliveries in accordance with the requirements of California Water Code Section 6066 of the Government Code.

Revenue and Expenditure Impacts During Water Shortages. The SFPUC uses a uniform volume charge. As a result, as sales decrease revenues are lost on a per unit basis. Because the marginal cost of water production is miniscule, as production is reduced the cost of service remains the same. Therefore, during a water shortage, as occurred during the 1987-92 drought, the SFPUC may need to raise water rates to make up for lost revenue due to less water use. The SFPUC retail rates, however, are frozen until 2006 due to Proposition H. As a result, retail rates cannot be adjusted to make up for revenue shortfalls unless voters repeal the Proposition or the Mayor declares an emergency as provided for in the City's Charter. The SFPUC does maintain an unappropriated fund balance that can be used to offset the effects of revenue shortfall. Budget considerations will be discussed at the time a drought is declared and revisited as the drought progresses.

III. Allocation Method and Process

A. Types of Allocation Methods

In the event of a mandatory rationing program, the SFPUC must adopt a system for allocating water amongst its retail customers. During the 1987-1992 drought four allocation methods were considered. They were the inside/outside or seasonal allocation method, the per capita allocation method, the uniform allocation method, and the percentage allocation method. The following provides of a description of each method and potential advantages or disadvantages of applying each method.

Inside/Outside allocation method. The Inside/Outside method, also referred to as seasonal method, applies a percent reduction to both indoor and outdoor use. To determine an individual's allocation, a base year is used and reductions are made to both inside and outside usage. Winter usage is identified as typically reflecting inside use. The average of the winter months (November, December, January, February) of the base year is used as the baseline for determining inside use for all 12 months. Usage in excess of the baseline is considered outside use. The monthly or bi-monthly inside/outside allocation is a composite of the inside use and the outside use reduced by their respective percentages. This method distributes water equitably and has been proven effective in achieving prior system-wide consumption goals. However, because this method reduces water allocations for all customers regardless of their current use, there is concern that water users consuming very low amounts of water will be affected disproportionately.

Per capita allocation method. The per capita allocation method applies a fixed amount of daily water for each resident. The allocation method requires that each residential occupant receives a fixed daily amount of water. To implement this method a census of the service area is required. Conducting a census is highly time consuming and the response to the survey is often statistically low and inaccurate. The method does not allow for differences in dwelling type, existing landscaping needs or special individual circumstances. A per capita allocation would prove unworkable with commercial and industrial customers and would require a different method for determining allocations.

Uniform allocation method. The uniform allocation method applies a fixed daily amount per dwelling unit for all residential customers. This method does not distribute water equitably to all customers, especially since it does not take into considerations the number of individuals living in the dwelling unit. As in the per capita plan, this method would prove unworkable for commercial and industrial customers.

Percentage allocation method. The method requires water allocation to be based on a straight percent reduction of past use. As an example to achieve a specified reduction goal, all customers would be allotted a percentage of the amount used in each billing period in the base year. The method requires a much greater reduction in inside use and could cause hardship on residential and commercial customers.

B. Preferred Allocation Method: Inside/Outside Method

During the 1987-92 drought the Inside/Outside method was implemented because it was found to be the most fair and reasonable method amongst the alternatives. At that time for those customers that appealed their allocations a per capita allocation was applied to the account.[10]

The Inside/Outside method will be applied to allocating water amongst retail customers during a water shortage due to drought. The allocation method will be applied to all accounts using more than 3 units of water per two-month billing period. A percentage reduction of inside and outside use will be applied to all accounts using more than 3 units of water during a two-month billing period. The appropriate percentage reductions to inside and outside use will be determined by the General Manager, or designee. The per capita allocation method will be used for customers who appeal their allotments. The formula will be similar in structure to that used during the 1987-92 drought. The General Manager, or designee, will determine at the time of the drought the number of gallons per capita per day to be used for the per capita method.

C. Allocation Process

As discussed previously, if the SFPUC anticipates that the reservoir system will be incapable of serving full deliveries to its customers, the SFPUC will announce a drought by March 31st. Consistent with the Interim Water Shortage Allocation Plan, the SFPUC will inform its retail customers of a water shortage by March 31st. The SFPUC will determine water allocations for each retail customer account using the Inside/Outside allocation method. Average winter and summer use factored into the Inside/Outside methodology will be based on water use for each retail customer from the previous year. For drought periods covering consecutive years, allocations will be based on water use for the last year prior to the drought declaration. The SFPUC will provide water use allocations to all retail customers by May 1st of the drought year. The water use allocations will become effective July 1st.

D. Appeal Process

On or before May 1st, retail customers will be notified of their reduced water allocations. Each retail customer will have the opportunity to appeal the allocation based on increased occupancy, medical exemptions, increased business, or other miscellaneous reasons. The SFPUC will provide retail customers with instructions on how to file appeals at the time the customers are notified of the water use allocations. The SFPUC will also inform customers of the methodology to be used in modifying allocations if they are granted.

[10] For illustration purposes the following describes how the per capita method was applied to appeals. The per capita allocation was calculated based on the number of occupants and a formula of 63 gpcpd for the first occupant, 55 gpcpd for the second occupant and 50 gpcpd for each additional occupant with a maximum total of 498 gpd per dwelling unit. As the 1987-92 drought worsened, the per capita allocation was based on the number of occupants and a formula of 50 gpcpd and a maximum total of 300 gpd for single family residences. It is important to note that at the time of the drought the average residential use was 74 gpcpd. Current average demand is 61 gpcpd.

E. Enforcement

The primary methods of enforcing mandatory rationing include excess use charges; installation of flow restrictors and/or shut-off of water.

During the 1987-92 drought excess use charges were applied as follows:

- If a customer consumed up to 10% over their allotment they would be charged 2 times the normal rate;
- If a customer consumed 10.01% to 20% over their allotment they would be charged 8 times the normal rate; and
- If a customer consumed 20.01% or over their allotment they would be charges 10 times the normal rate.

In the event of mandatory rationing, the SFPUC will impose excess use charges similar to those described above. The General Manager, or designee, will inform retail customers of the multiplier rate that will be applied for determining excess use charges. The SFPUC will also offer an audit at the first run-over of the allocation to determine if there are any leaks. In some cases, excess use charges may be reversed if leaks are found and repaired immediately.

In the event that water is used in excess of the customer's specified allotment, the SFPUC could, after one written warning, install a flow restrictor on the customer's service line. The customer may be charged to install and remove the flow restrictor, as was done in the 1987-92 drought. The General Manager, or designee, will determine the relevant charge at the time of the drought. If a customer continues to consume water in excess of its allotment, the SFPUC has the authority to discontinue the customer's water service and require the customer to bear the cost for the re-connection of water service.

The Landlord Pass-through Ordinance[11] allows landlords to pass up to 50 percent of excess use charges on to their tenants under the following conditions:

(a) the landlord must provide written certification that permanently-installed retrofit devices to reduce water use in toilet flushing or low-flow toilets (1.6 gallons per flush), low flow showerheads (no more than 2.5 gallons per minute), and faucet aerators (where installation is physically feasible);
(b) the landlord provides written certification that there are no none plumbing leaks in the building and that any reported leaks have been fixed; and
(c) the landlord provides a copy of the water bill for the period in which the penalty was charged.

Under mandatory rationing, the SFPUC will also specify waste water prohibitions that if violated may result in installation of a flow restrictor and shut-off of water, if the violation continues.

[11] San Francisco Administrative Code Section 37.3

All or some of the following water waste prohibitions may be enforced during a drought. The General Manager, or designee, will declare and inform customers of all water waste prohibitions at the time of a drought.

Water Waste Prohibitions

- Water waste, including but not limited to, any flooding or runoff into the street or gutters, shall be prohibited.
- Hoses shall not be used to clean sidewalks, driveways, patios, plazas, homes, businesses, parking lots, roofs, awnings or other hard surfaces areas.
- Hoses used for any purpose shall have positive shutoff valves.
- Restaurants shall serve water to customers only upon request.
- Potable water shall not to be used to clean, fill or maintain levels in decorative fountains.
- Use of additional water shall not be allowed for new landscaping or expansion of existing facilities unless low water use landscaping designs and irrigation systems are employed.
- Water service connections for new construction shall be granted only if water saving fixtures or devices are incorporated into the plumbing system.
- Use of potable water for consolidation of backfill, dust control or other non-essential construction purposes shall be prohibited.
- Irrigation of lawns, play fields, parks, golf courses, cemeteries, and landscaping of any type with potable water shall be reduced by at least the amount specified for outside use in the adopted rationing plan.
- Verified water waste as determined by the Water Department would serve as prima facie evidence that the allocation assigned to the water account is excessive; therefore, the allocation shall be subject to review and possible reduction, including termination of service.
- Water used for all cooling purposes shall be recycled.
- The use of groundwater and/or reclaimed water for irrigation of golf courses, median strips, and similar turf areas shall be strongly encouraged.
- The use of groundwater and/or reclaimed water for street sweepers/washers shall be strongly encouraged.

- The washing of all automobiles, motorcycles, RVS, trucks, transit vehicles, trailers, boats, trains and airplanes shall be prohibited outside of a commercial washing facility.

- Exceptions to the above use restriction will apply to windows on all vehicles and such commercial or safety vehicles requiring cleaning for health and safety reasons.

- Water used for all cooling purposes or for commercial car washes shall be recycled.

- The use of potable water on golf courses shall be limited to the irrigation of putting greens. The use of groundwater and reclaimed water shall be permitted when approved by the Department of Health.

- The filling of new swimming pools, spas, hot tubs or the draining and refilling of existing pools, etc., shall be prohibited; topping off shall be allowed to the extent that the designated allocation is not exceeded.

- The irrigation of median strips with potable water shall be prohibited. The use of groundwater and reclaimed water shall be permitted when approved by the Department of Health.

- The use of potable water for street sweepers/washers shall be prohibited. The use of groundwater and reclaimed water shall be permitted when approved by the Department of Health.

Appendix G

Water Shortage Allocation Plan

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ATTACHMENT H

WATER SHORTAGE ALLOCATION PLAN

This Interim Water Shortage Allocation Plan ("Plan") describes the method for allocating water between the San Francisco Public Utilities Commission ("SFPUC") and the Wholesale Customers collectively during shortages caused by drought. The Plan implements a method for allocating water among the individual Wholesale Customers which has been adopted by the Wholesale Customers. The Plan includes provisions for transfers, banking, and excess use charges. The Plan applies only when the SFPUC determines that a system-wide water shortage due to drought exists, and all references to "shortages" and "water shortages" are to be so understood. This Plan was adopted pursuant to Section 7.03(a) of the 1984 Settlement Agreement and Master Water Sales Contract and has been updated to correspond to the terminology used in the June 2009 Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County ("Agreement").

SECTION 1. SHORTAGE CONDITIONS

1.1. Projected Available SFPUC Water Supply. The SFPUC shall make an annual determination as to whether or not a shortage condition exists. The determination of projected available water supply shall consider, among other things, stored water, projected runoff, water acquired by the SFPUC from non-SFPUC sources, inactive storage, reservoir losses, allowance for carryover storage, and water bank balances, if any, described in Section 3.

1.2 Projected SFPUC Purchases. The SFPUC will utilize purchase data, including volumes of water purchased by the Wholesale Customers and by Retail Customers (as those terms are used in the Agreement) in the year immediately prior to the drought, along with other available relevant information, as a basis for determining projected system-wide water purchases from the SFPUC for the upcoming year.

1.3. Shortage Conditions. The SFPUC will compare the available water supply (Section 1.1) with projected system-wide water purchases (Section 1.2). A shortage condition exists if the SFPUC determines that the projected available water supply is less than projected system-wide water purchases in the upcoming Supply Year (defined as the period from July 1 through June 30). When a shortage condition exists, SFPUC will determine whether voluntary or mandatory actions will be required to reduce purchases of SFPUC water to required levels.

1.3.1 Voluntary Response. If the SFPUC determines that voluntary actions will be sufficient to accomplish the necessary reduction in water use throughout its service area, the SFPUC and the Wholesale Customers will make good faith efforts to reduce their water purchases to stay within their annual shortage allocations and associated monthly water use budgets. The SFPUC will not impose excess use charges during periods of voluntary rationing, but may suspend the prospective accumulation of water bank credits, or impose a ceiling on further accumulation of bank credits, consistent with Section 3.2.1 of this Plan.

1.3.2 Mandatory Response. If the SFPUC determines that mandatory actions will be required to accomplish the necessary reduction in water use in the SFPUC service area, the SFPUC may implement excess use charges as set forth in Section 4 of this Plan.

1.4. Period of Shortage. A shortage period commences when the SFPUC determines that a water shortage exists, as set forth in a declaration of water shortage emergency issued by the SFPUC pursuant to California Water Code Sections 350 et seq. Termination of the water shortage emergency will be declared by resolution of the SFPUC.

SECTION 2. SHORTAGE ALLOCATIONS

2.1. Annual Allocations between the SFPUC and the Wholesale Customers. The annual water supply available during shortages will be allocated between the SFPUC and the collective Wholesale Customers as follows:

Level of System Wide Reduction in Water Use Required	Share of Available Water	
	SFPUC Share	Wholesale Customers Share
5% or less	35.5%	64.5%
6% through 10%	36.0%	64.0%
11% through 15%	37.0%	63.0%
16% through 20%	37.5%	62.5%

The water allocated to the SFPUC shall correspond to the total allocation for all Retail Customers.

2.2 Annual Allocations among the Wholesale Customers. The annual water supply allocated to the Wholesale Customers collectively during system wide shortages of 20 percent or less will be apportioned among them based on a methodology adopted by all of the Wholesale Customers, as described in Section 3.11(C) of the Agreement. In any year for which the methodology must be applied, the Bay Area Water Supply and Conservation Agency ("BAWSCA") will calculate each Wholesale Customer's individual percentage share of the amount of water allocated to the Wholesale Customers collectively pursuant to Section 2.1. Following the declaration or reconfirmation of a water shortage emergency by the SFPUC, BAWSCA will deliver to the SFPUC General Manager a list, signed by the President of BAWSCA's Board of Directors and its General Manager, showing each Wholesale Customer together with its percentage share and stating that the list has been prepared in accordance with the methodology adopted by the Wholesale Customers. The SFPUC shall allocate water to each Wholesale Customer, as specified in the list. The shortage allocations so established may be transferred as provided in Section 2.5 of this Plan. If BAWSCA or all Wholesale Customers do not provide the SFPUC with individual allocations, the SFPUC may make a final allocation decision after first meeting and discussing allocations with BAWSCA and the Wholesale Customers.

The methodology adopted by the Wholesale Customers utilizes the rolling average of each individual Wholesale Customer's purchases from the SFPUC during the three immediately

preceding Supply Years. The SFPUC agrees to provide BAWSCA by November 1 of each year a list showing the amount of water purchased by each Wholesale Customer during the immediately preceding Supply Year. The list will be prepared using Customer Service Bureau report MGT440 (or comparable official record in use at the time), adjusted as required for any reporting errors or omissions, and will be transmitted by the SFPUC General Manager or his designee.

2.3. Limited Applicability of Plan to System Wide Shortages Greater Than Twenty Percent. The allocations of water between the SFPUC and the Wholesale Customers collectively, provided for in Section 2.1, apply only to shortages of 20 percent or less. The SFPUC and Wholesale Customers recognize the possibility of a drought occurring which could create system-wide shortages greater than 20 percent despite actions taken by the SFPUC aimed at reducing the probability and severity of water shortages in the SFPUC service area. If the SFPUC determines that a system wide water shortage greater than 20 percent exists, the SFPUC and the Wholesale Customers agree to meet within 10 days and discuss whether a change is required to the allocation set forth in Section 2.1 in order to mitigate undue hardships that might otherwise be experienced by individual Wholesale Customers or Retail Customers. Following these discussions, the Tier 1 water allocations set forth in Section 2.1 of this Plan, or a modified version thereof, may be adopted by mutual written consent of the SFPUC and the Wholesale Customers. If the SFPUC and Wholesale Customers meet and cannot agree on an appropriate Tier 1 allocation within 30 days of the SFPUC's determination of water shortage greater than 20 percent, then (1) the provisions of Section 3.11(C) of the Agreement will apply, unless (2) all of the Wholesale Customers direct in writing that a Tier 2 allocation methodology agreed to by them be used to apportion the water to be made available to the Wholesale Customers collectively, in lieu of the provisions of Section 3.11(C).

The provisions of this Plan relating to transfers (in Section 2.5), banking (in Section 3), and excess use charges (in Section 4) shall continue to apply during system-wide shortages greater than 20 percent.

2.4. Monthly Water Budgets. Within 10 days after adopting a declaration of water shortage emergency, the SFPUC will determine the amount of Tier 1 water allocated to the Wholesale Customers collectively pursuant to Section 2.1. The SFPUC General Manager, using the Tier 2 allocation percentages shown on the list delivered by BAWSCA pursuant to Section 2.2, will calculate each Wholesale Customer's individual annual allocation. The SFPUC General Manager, or his designee, will then provide each Wholesale Customer with a proposed schedule of monthly water budgets based on the pattern of monthly water purchases during the Supply Year immediately preceding the declaration of shortage (the "Default Schedule"). Each Wholesale Customer may, within two weeks of receiving its Default Schedule, provide the SFPUC with an alternative monthly water budget that reschedules its annual Tier 2 shortage allocation over the course of the succeeding Supply Year. If a Wholesale Customer does not deliver an alternative monthly water budget to the SFPUC within two weeks of its receipt of the Default Schedule, then its monthly budget for the ensuing Supply Year shall be the Default Schedule proposed by the SFPUC.

Monthly Wholesale Customer water budgets will be derived from annual Tier 2 allocations for purposes of accounting for excess use. Monthly Wholesale Customer water budgets shall be adjusted during the year to account for transfers of shortage allocation under Section 2.5 and

transfers of banked water under Section 3.4.

2.5. Transfers of Shortage Allocations. Voluntary transfers of shortage allocations between the SFPUC and any Wholesale Customers, and between any Wholesale Customers, will be permitted using the same procedure as that for transfers of banked water set forth in Section 3.4. The SFPUC and BAWSCA shall be notified of each transfer. Transfers of shortage allocations shall be deemed to be an emergency transfer and shall become effective on the third business day after notice of the transfer has been delivered to the SFPUC. Transfers of shortage allocations shall be in compliance with Section 3.05 of the Agreement. The transferring parties will meet with the SFPUC, if requested, to discuss any effect the transfer may have on its operations.

SECTION 3. SHORTAGE WATER BANKING

3.1. Water Bank Accounts. The SFPUC shall create a water bank account for itself and each Wholesale Customer during shortages in conjunction with its resale customer billing process. Bank accounts will account for amounts of water that are either saved or used in excess of the shortage allocation for each agency; the accounts are not used for tracking billings and payments. When a shortage period is in effect (as defined in Section 1.4), the following provisions for bank credits, debits, and transfers shall be in force. A statement of bank balance for each Wholesale Customer will be included with the SFPUC's monthly water bills.

3.2. Bank Account Credits. Each month, monthly purchases will be compared to the monthly budget for that month. Any unused shortage allocation by an agency will be credited to that agency's water bank account. Credits will accumulate during the entire shortage period, subject to potential restrictions imposed pursuant to Section 3.2.1. Credits remaining at the end of the shortage period will be zeroed out; no financial or other credit shall be granted for banked water.

3.2.1. Maximum Balances. The SFPUC may suspend the prospective accumulation of credits in all accounts. Alternatively, the SFPUC may impose a ceiling on further accumulation of credits in water bank balances based on a uniform ratio of the bank balance to the annual water allocation. In making a decision to suspend the prospective accumulation of water bank credits, the SFPUC shall consider the available water supply as set forth in Section 1.1 of this Plan and other reasonable, relevant factors.

3.3. Account Debits. Each month, monthly purchases will be compared to the budget for that month. Purchases in excess of monthly budgets will be debited against an agency's water bank account. Bank debits remaining at the end of the fiscal year will be subject to excess use charges (see Section 4).

3.4. Transfers of Banked Water. In addition to the transfers of shortage allocations provided for in Section 2.5, voluntary transfers of banked water will also be permitted between the SFPUC and any Wholesale Customer, and among the Wholesale Customers. The volume of transferred water will be credited to the transferee's water bank account and debited against the transferor's water bank account. The transferring parties must notify the SFPUC and BAWSCA of each transfer in writing (so that adjustments can be made to bank accounts), and will meet with the SFPUC, if requested, to discuss any affect the transfer may have on SFPUC operations. Transfers of banked water shall be deemed to be an emergency transfer and shall become effective on the third business day after notice of the transfer has been delivered to the SFPUC.

If the SFPUC incurs extraordinary costs in implementing transfers, it will give written notice to the transferring parties within ten (10) business days after receipt of notice of the transfer. Extraordinary costs means additional costs directly attributable to accommodating transfers and which are not incurred in non-drought years nor simply as a result of the shortage condition itself. Extraordinary costs shall be calculated in accordance with the procedures in the Agreement and shall be subject to the disclosure and auditing requirements in the Agreement. In the case of transfers between Wholesale Customers, such extraordinary costs shall be considered to be expenses chargeable solely to individual Wholesale Customers and shall be borne equally by the parties to the transfer. In the case of transfers between the SFPUC and a Wholesale Customer, the SFPUC's share of any extraordinary transfer costs shall not be added to the Wholesale Revenue Requirement.

3.4.1. Transfer Limitations. The agency transferring banked water will be allowed to transfer no more than the accumulated balance in its bank. Transfers of estimated prospective banked credits and the "overdrafting" of accounts shall not be permitted. The price of transfer water originally derived from the SFPUC system is to be determined by the transferring parties and is not specified herein. Transfers of banked water shall be in compliance with Section 3.05 of the Agreement.

SECTION 4. WHOLESALE EXCESS USE CHARGES

4.1. Amount of Excess Use Charges. Monthly excess use charges shall be determined by the SFPUC at the time of the declared water shortage consistent with the calendar in Section 6 and in accordance with Section 6.03 of the Agreement. The excess use charges will be in the form of multipliers applied to the rate in effect at the time the excess use occurs. The same excess use charge multipliers shall apply to the Wholesale Customers and all Retail Customers. The excess use charge multipliers apply only to the charges for water delivered at the rate in effect at the time the excess use occurred.

4.2 Monitoring Suburban Water Use. During periods of voluntary rationing, water usage greater than a customer's allocation (as determined in Section 2) will be indicated on each SFPUC monthly water bill. During periods of mandatory rationing, monthly and cumulative water usage greater than a Wholesale Customer's shortage allocation and the associated excess use charges will be indicated on each SFPUC monthly water bill.

4.3. Suburban Excess Use Charge Payments. An annual reconciliation will be made of monthly excess use charges according to the calendar in Section 6. Annual excess use charges will be calculated by comparing total annual purchases for each Wholesale Customer with its annual shortage allocation (as adjusted for transfers of shortage allocations and banked water, if any). Excess use charge payments by those Wholesale Customers with net excess use will be paid according to the calendar in Section 6. The SFPUC may dedicate excess use charges paid by Wholesale Customers toward the purchase of water from the State Drought Water Bank or other willing sellers in order to provide additional water to the Wholesale Customers. Excess use charges paid by the Wholesale Customers constitute Wholesale Customer revenue and shall be included within the SFPUC's annual Wholesale Revenue Requirement calculation.

SECTION 5. GENERAL PROVISIONS GOVERNING WATER SHORTAGE ALLOCATION PLAN

5.1. Construction of Terms. This Plan is for the sole benefit of the parties and shall not be construed as granting rights to any person other than the parties or imposing obligations on a party to any person other than another party.

5.2. Governing Law. This Plan is made under and shall be governed by the laws of the State of California.

5.3. Effect on Agreement. This Plan describes the method for allocating water between the SFPUC and the collective Wholesale Customers during system-wide water shortages of 20 percent or less. This Plan also provides for the SFPUC to allocate water among the Wholesale Customers in accordance with directions provided by the Wholesale Customers through BAWSCA under Section 2.2, and to implement a program by which such allocations may be voluntarily transferred among the Wholesale Customers. The provisions of this Plan are intended to implement Section 3.11(C) of the Agreement and do not affect, change or modify any other section, term or condition of the Agreement.

5.4. Inapplicability of Plan to Allocation of SFPUC System Water During Non-Shortage Periods. The SFPUC's agreement in this Plan to a respective share of SFPUC system water during years of shortage shall not be construed to provide a basis for the allocation of water between the SFPUC and the Wholesale Customers when no water shortage emergency exists.

5.5. Termination. This Plan shall expire at the end of the Term of the Agreement.. The SFPUC and the Wholesale Customers can mutually agree to revise or terminate this Plan prior to that date due to changes in the water delivery capability of the SFPUC system, the acquisition of new water supplies, and other factors affecting the availability of water from the SFPUC system during times of shortage.

SECTION 6. ALLOCATION CALENDAR

6.1. Annual Schedule. The annual schedule for the shortage allocation process is shown below. This schedule may be changed by the SFPUC to facilitate implementation.

6.1.1

In All Years	Target Dates
1. SFPUC delivers list of annual purchases by each Wholesale Customer during the immediately preceding Supply Year	November 1
2. SFPUC meets with the Wholesale Customers and presents water supply forecast for the following Supply Year	February
3. SFPUC issues initial estimate of available water supply	February 1
4. SFPUC announces potential first year of drought (if applicable)	February 1
5. SFPUC and Wholesale Customers meet upon request to exchange information concerning water availability and projected system-wide purchases	February 1-May 31
6. SFPUC issues revised estimate of available water supply, and confirms continued potential shortage conditions, if applicable	March 1
7. SFPUC issues final estimate of available water supply	April 15th or sooner if adequate snow course measurement data is available to form a robust estimate on available water supply for the coming year.
8. SFPUC determines amount of water available to Wholesale Customers collectively	April 15th or sooner if adequate snow course measurement data is available to form a robust estimate on available water supply for the coming year.

In Drought Years	Target Dates
9. SFPUC formally declares the existence of water shortage emergency (or end of water shortage emergency, if applicable) under Water Code Sections 350 et. seq.	April 15-31
10. SFPUC declares the need for a voluntary or mandatory response	April 15-31
11. BAWSCA submits calculation to SFPUC of individual Wholesale Customers' percentage shares of water allocated to Wholesale Customers collectively	April 15- 31
12. SFPUC determines individual shortage allocations, based on BAWSCA's submittal of individual agency percentage shares to SFPUC, and monthly water budgets (Default Schedule)	April 25—May 10
13. Wholesale Customers submit alternative monthly water budgets (optional)	May 8-May 24
14. Final drought shortage allocations are issued for the Supply Year beginning July 1 through June 30	June 1
15. Monthly water budgets become effective	July 1
16. Excess use charges indicated on monthly Suburban bills	August 1 (of the beginning year) through June 30 (of the succeeding year)
17. Excess use charges paid by Wholesale Customers for prior year	August of the succeeding year

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Appendix H

Sample Water Shortage Contingency Resolution

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SAMPLE WATER SHORTAGE CONTINGENCY RESOLUTION

PUBLIC UTILITIES COMMISSION

City and County of San Francisco

RESOLUTION NO. _____

WHEREAS, The San Francisco Public Utilities Commission (SFPUC) obtains water from the Hetch Hetchy Water and Power project and local Bay Area reservoirs; and

WHEREAS, The SFPUC has determined that a shortage condition exists because the projected available water supply is less than projected system-wide water purchases in the upcoming Supply Year beginning July 1; and

WHEREAS, In 2000 the SFPUC and Suburban Purchases adopted an Interim Water Shortage Allocation Plan (IWSAP or "Tier One Plan") and an Interim Water Shortage Allocation Plan Among Suburban Purchasers ("Tier Two Plan"); and

WHEREAS, The Tier One Plan describes the method for allocating water between the SFPUC and the Suburban (wholesale) Purchasers collectively during shortages caused by drought; and

WHEREAS, The Tier Two Plan describes the method for allocating the water made available by the SFPUC during shortages caused by drought among the Suburban Purchasers (individually), when the SFPUC determines that a system-wide water shortage due to drought exists; and

WHEREAS, In 2001 the SFPUC adopted a Retail Water Shortage Allocation Plan (RWSAP) as a guidance tool to be used for allocating water amongst Retail customers in the event of a water shortage due to drought; and

WHEREAS, The RWSAP details a three-stage program of action to be taken to reduce Retail water use during drought, with Stage 1 consisting of voluntary measures, Stage 2 of mandatory measures and Stage 3 of more severe mandatory measures; and

WHEREAS, Depending on the level of water demand and the desired objective for water use reduction, one, two or all three stages of the RWSAP may be required; and

WHEREAS, Staff has made the final determination of available water supply required by the Tier One Plan with the SFPUC's suburban (wholesale) water customers, including, among other things, stored water, projected runoff, water acquired by the SFPUC from non-SFPUC sources, inactive storage, reservoir losses, and an allowance for carryover storage; and

WHEREAS, The SFPUC has determined that the available water supply is insufficient and that unless water consumption is decreased there may be insufficient water supplies for human consumption, sanitation and fire protection needs; and

WHEREAS, Decreases in water consumption may be achieved by voluntary or mandatory conservation measures by Retail and Wholesale water customers; and

WHEREAS, Decreases in water consumption may be achieved by implementing the voluntary and/or mandatory shortage allocation provisions of the Tier One Plan and the RWSAP; and

WHEREAS, Staff has, in accordance with Section II.C of the RWSAP, presented the water supply situation and other required information at a regularly scheduled Commission meeting for public input, and advertised this the meeting in accordance with the requirements of California Water Code Section 6066 of the Government Code; now, therefore be it

RESOLVED, That the SFPUC declares a Water Shortage Emergency pursuant to sections 350 et. seq. of the California Water Code; and be it further

RESOLVED, That the SFPUC directs staff to determine the amount of water allocated to the Suburban Purchasers collectively pursuant to Section 2.1 of the Tier One Plan, and to allocate the available water supply among individual wholesale water customers based on information received from the Bay Area Water Supply and Conservation Agency in accordance with Section 2.2 of the Tier One Plan, and the Section 2 of the Tier Two Plan; and be it further

RESOLVED, That the SFPUC directs staff to take all other necessary steps to implement the Tier One Plan, including but not limited to provisions related to establishment of monthly water budgets and the creation of water shortage bank accounts; and be it further

RESOLVED, That the SFPUC directs staff to take all necessary steps to implement the RWSAP, including Stage 1, Stage 2 and/or Stage 3 measures, as required to meet water use reduction goals based on reduced water supplies from the Regional Water System; and be it further

FURTHER RESOLVED ***[for mandatory rationing stages only]***, That, in accordance with the IWSAP ("Tier One Plan") Section 4.1 and the RWSAP Section II.B, the SFPUC adopts the following schedule of excess use charges applicable to its suburban (Wholesale) and Retail customers:

If Water Purchases Exceed the Shortage Allocation by:	**The Excess Use Charge Multiplier is:**
Up to 10.00%	2
10.01% to 20.00%	8
20.01% or more	10

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of _____

_____

Secretary, Public Utilities Commission

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SFPUC
WATER
WASTEWATER
POWER

2010 URBAN WATER MANAGEMENT PLAN

FOR THE CITY AND COUNTY OF SAN FRANCISCO

Prepared by: The San Francisco Public Utilities Commission April 27, 2011

PUBLIC REVIEW DRAFT